Testoil-ISO 4113

# Test Specifications Fuel Injection Pumps MP 001/4 MB 2,0 9 4

44

and Governors

4. Edition

En

PES 4 M 50 C 320 RS 103 RSF 375 / 2250 M 19 Komb.Nr. 0 400 074 978 Sales model 400 074 977 company Daimler-Benz

Om 615 44 kV (60 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

1,70-1,80 (1,65-1,85)

min (from BDC)

20mm

Control rod travel

Rotational speed	Control rod travel	Fuel delivery	Ofference	Control rod travel	Fuel delivery	Spring pro-tonorung schied pro-tonorung
rev/min	mm.	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> /100 strokes	~~	cm <sup>3</sup> /100 strokes	-
1	2	3	4	2	3	•
1000	12,7+0,	3,2-3,3	0,25(0,3)			_
375	6,9-7,1	0,65-0,75	0,1(0,15	1		
1800		•	0,25(0,3)			
2200	P 1	1	0,25(0,3)			1

Set uniform delivery according to the values in \_\_\_\_

**Checking values in brachets** 

#### **B.** Governor Settings

Lower rated s	peed		Upper rated s	peed		Variations in control rod travel		
Degree of deflection	Control rad	Rotational speed	Degree of deflection	Control rod travel	Rotational speed		Rotational	Control rod travel
of control lever	; mm	rev. Twn	of control	~	new/Mach	1	164,1000	-
•	2	3	.4	5	6	7	8	•
(	min.12,1 )6,9-7,1 ** 2,5	250 375 400 - 720-820	50 G	0 - 1,	6 2500	0000	1800 1000 Santchings	min. 20,3 12,2-12,4 12,7-12,8

#### C. Settings for Fuel Injection Pump with Governor Mounted

Full-load d	no 40°C (104°F)	Full load speed regulation	Vanations Gelivery		Starting I little	uel delivery	Difference
1032 (M 1037 1034/1100 1	cm³/1000 strokes	revmn	•	cm³/1000 strokes 5	rgymun 6	cm1/1000 strokes	cm <sup>3</sup> /1000 strokes 8
2200	33,0-35,0 (32,0-36,0)	2500* RW 7,2-7,6	1800	33,0-35,0 (32,0-36,0) 32,0-33,0 (32,0-35,0)	100 375 2500	min. 55,0 6,5-7,5 (5,5-9,0) 13,0-17,0 (12,0-18,0)	1,0 1,5 2,5 see (15) 3,0 (16)

Checking values in brackets

Ca. 3,5 XXXXXXX

- 1. \*\* Set the idle auxiliary spring at n = 400 min<sup>-1</sup> so that the control-rod travel is exceeded by 0.1 0.2 mm.
- Setting the idle control-lever position:
   At 1000 min<sup>-1</sup>, control rod travel 1.9 2.0 mm
- 3. Check the idle auxiliary spring shutoff

  Control lower socition 472. After change of

Control-lever position 47°. After change-over point up to 550 min<sup>-1</sup> no change in control-rod travel. Control-lever position 30°. Speed range 350 min<sup>-1</sup> - 450 min<sup>-1</sup>

4. Check the pneumatic shutoff box

Control lever at idle stop.

At n = 375 min<sup>-1</sup> and pu = 450 mbar (vacuum)

(338 mmHg) the control rod must return quickly to control-rod travel = 0 mm.

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 VOL 10,0 o

2. Edition

Testoil-ISO 4113

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PE 6 P 110 A 320 RS 3080

ROV 250-1100 PA 589

supersedille 81
company Yo I vo
engine:

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at pres	droke (	3.45-3.65)	mm (from BDC) <sup>2</sup>	RW 9,0	- 12,0 mm	
Rotational speed		Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
revirsin 1	2	cm <sup>3</sup> /100 strokes 3	cm <sup>3</sup> / 100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6
700	12,2+0,1	16,7 - 16,9	0,4(0,8)			
250	4,0-4,2	1,6 - 2,0	0,3(0,7)			1
			L	1		1

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated s				Intermediate	rated sp	1		Lower rated	speed	•	Siring s	ieeve travei
deflection	Control Food travel	Control rod travel	<b>①</b>	Degree of defection of control		Cont	rol rod	Degree of deflection		Control rod travel		, ①
lever 1		700 / Miles 3	<b>②</b>	lever 4	rev/min 5	mm 6	•	of control lever 7	rev/min 8	mm 3	rev/min	mm 11
max.	1180	15,2-17	,8	•	-		-	ca. 8	100	min.5,6		0,6-0,9
ca. 63	4,0	1160-11 1225-12	55						250 305-:	4,0-4,2 365=2,0⊞m	670	5,4-6,4 6,4-6,6
	1350	0 - 1	,0	•				<b>(3</b> )			1100	7,3

Torque control travel a =

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil tes		intermediate speed	-	pred (9)	1	fuel delivery 6	Torque- travel	control (5)
rav/men 1	chi <sup>3</sup> /1000 strakes 2	rovinin 🍪 3	rovinia 4	cm <sup>3</sup> /1000 strokes 5	rovAmin G	cm <sup>3</sup> /1000 strokes	rev/min	travel mm
LDA 700	0,75 bar 167,0-169,0 (164,0-172,0)		LDA 700	0 bar 121,0-125,0 (118,0-128,0		160,0-190,0 / 20,0-21 mm RW		

Checking values in brackets

\* 1 mm less control rad travel then col. 2

Test at n =

500

rev/min decreasing pressure – in bar gauge pressure

Pump/governor	Setting	Measurement	XXXXIIIMinution Control rod travel- XXXXIIIXXCe
	Gauge pressure = bar		mm (1) .
LS 3080 +	0,54		11,8 - 11,9
PA 589		0.75	12,2 - 12,3
		0	9,7 - 9,9
		0,34	10,5 - 10,7
	·		
•			

Notes:

(1) when n =

rev/min and gauge pressure =

bar (= maxemum full-load control rod travel)

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# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 KHD 15,8 e

2. Edition

PE 10 P 110 A 920/5 LS 3073

RQV 300-1250 PA 549 RQV 300-1250 PA 549-1 Superseque companKHD engine: BF 10 L 413 F 294 kW (400 PS)<sub>1</sub>

1 - 10- 9 - 4 - 3 - 6 - 5 - 8 - 7 - 2 0 - 27-72 -99 -144-171-216-243-288-315° - 0,5° (- 0,75°)

2500 min

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at pres	stroke	(2.75-2.95)	mm (from BDC)			
Rotational speed	Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm³/ 100 strokes	Control rod travel	Fuel delivery  cm3/100 strokes	Spring pre-tensioning (torque-control valve)
1250	12,1+0,1	14,8 - 15,2	0,4(0,8)	2		
			4			1
300	6,3-6,5	1,1 - 1,5	0,4(0,7)			
	<u> </u>			<u> </u>		<u> </u>

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

... PA 549 + .. PA 549-1

Upper rated s	peed		Intermediat	e rated sp	eed		Lower rated	speed		Sliding s	sleeve travel
	rev/min Control	Control rod (1	Degree of deflection		Control rod travel		Degree of deflection		Control rod travel	1	, ①
of control	rod travel		of control lever	rev/min	mm (	4)	of control lever	rev/min	mm (	rev/min	mm
,	2	3	14	5	6		7	8	9	10	11
max.	1340 11,1 4,0	15,2-17,1 1290-130 1370-140	5	-	-		ca. 13	100 300	min. 8, 6,3-6,5 00=2,0mm	580 920	0,5-0,8 2,9-3,1 4,8-5,0
	1500	0 - 1,					<b>3</b> a	520-3	00-2 <b>3</b> 0mm	1250	8,0

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roo Test oil ten		Rotational-speed 20 timitation intermediate speed	Fuel delivinghide s	ery characteristics (5e) peed (50)	Starting Idle switchir	•	Torque- travel	Control rod
rev/min	c/h³/1000 strokes	rev/min 40	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	mm
1	2	3	4	3	<u> </u>	<u>'</u>	0	•
LDA 1250	0,9 bar 148,0-152,0 (146,0-154,0)	1290-1300*	LDA 900	0,9 bar 143,0-147,0 (140,0-150.0)	100	130,0-150,0 / 13,0 ~ 13,2 mm RW	-	•
			LDA 500	0 bar 95,097,0 (92,0-100,0)		<u> </u>		

Chucking values in brackets

\* 1 mm less control rod travel than col. 2

1.83

A5

Test at n =

500

rev/min decreasing pressure = in bar gauge pressure increasing

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = ba	Gauge pressure = bar	
PE10PLS3073	0,9		12,1 - 12,2
+PA 549 +PA 549-1		0	9,7 - 9,8
+ N 545-1		0,55	11,1 - 11,2
		0,47	9,9 - 10,1
	•		

Notes:

(1) when n =

rev/min and gauge pressure =

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 KHD 19,0 e 2. Edition

estoil-ISO 4113

PE 12 P 110 A 920 LS 3060 RQV 300-1250 PA 479 KR

supersede9.82

company: KHD

1 - 4 - 9 - 8 - 5 - 2 - 11- 10- 3 - 6 - 7 - 12 0 - 45- 60-105-120-165-180-225-240-285-300-345°+0,5° (+0,75°)

engine: BF 12 L 413 FC 386 kW - 2500 min

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke (2,75-2,95)

mm (from BDC)

Rotational speed rev/min	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioninc (torque-control valve) mm 6
	11,7+0,1	14,7 - 15, 1	0,4 (0,8)			
300	6,7-6,9	1,6 - 2,2	0,7 (1,0)			
·				;		

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated s	peed		Intermediate	rated sp	eed	Lower rated	speed		Sliding s	leeve travel
dellection chartol	rev/min Control rod travel mm	Control rod travel mm rev/min (2a)	Dagree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel	rev/min	mm (1)
1	2	3	4	5	6	7	8	9	10	11
max.	1270	15,2-17,8	-	- 1	-	ca. 13	100	min. 8,3	250	0,2-0,6
ca. 60	10,7 4,0 1550					350-500	300	6,7-6,9		3,4-3,7 5,3-5,5 8,3
						<b>3</b>				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

	1 stop np. 40°C (104°F) 2	limitation intermediate speed			idle switchin	ng point	Torque- travel	control 5 Control rod travel
rev/min	cm³/1000 strokes .	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	nim\ve:	m <del>m</del>
1	2	3	4	5	0	7	8	,
LDA 1250	0,75 bar 147,0-151,0 (145,0-153,0)	1280-1290*	LDA 850 LDA 500	0,75 bar 122,0-126,0 (119,0-129,0) 0 bar 78,0-80,0) (74,0-84,0)	100	140,0-160,0	850	11,7+0, 11,0+0, 10,1+0,

Checking values in brackets

\*1 mm less control rod travel than col. 2

1.83

A7

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
2	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 12 PLS 3060 +PA 479 KR	0,35	0.75 0 0,22	10,1 - 10,3 10,4 - 10,5 9,0 - 9,2 9,6 - 9,8

Notes:

(1) when n =

rev/min and gauge pressure =

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# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 KHD \_
2. Edition

En\_

PE 10 P 110 A 920/5 LS 3073 RQV 300-1150 PA 549

1-10-9 - 4- 3 - 6 - 5 - 8 - 7 - 2 0-27-72-99-144-171-216-243-288-315 ° -0,5 ° (-0,75 °) supersede 82 company: KHD

engine: BF 10L 413 F 265 kW (360 PS)

bei 2050 min -1 bzw. 259 kW (352 PS)

(Maxidyne)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke (2,75-2,95) mm: (from BDC)

Rotational speed rev/min	Control rod travel mm 2	Fuel delivery  cm³/100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
800	11,6+0,1	13,8-14,0	0,4(0,8)			
300	6,9-7,1	1,8 - 2,4	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated s	peed			Intermediate	rated sp	eed	Lower rated	speed	Sliding sleeve travel		
deflection of control		Control red travel mm rev/min 3	<b>9</b>	Degree of deflection of control lever	rev/min 5	Control rod travel mm 4	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 3 9	rev/min	(1) mm 11
max.	1220	15,2-	17,8	,	-	-	ca.12		min.8,5 6,9-7,1	250 550	
ca. 64	9,7 4,0 1400	1190-1 1270-1 0 -	300					465-9	525 = 2,0	1150	
							<b>②</b>				1

Torque control travel a =

ma

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load di Control-roi Test oil ten		Rotational-speed (26) limitation intermediate speed				Starting Idle switchir		Torque- travel	control 5
rev/min	cfh³/1000 strokes .	rev <i>ir</i> nin	•	rev/min 4	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min 8	mm 9
LDA 800	0,9 bar 138,0-140,0 (135,0-143,0)	1190-1200	*	LDA 500	0 bar 85,0-89,0 (82,0-92,0)	100	110,0-140,0	1025 875	10,7+0, 10,9+0, 11,4+0, 11,6+0,

Checking values in brackets

1 mm less control rod travel than col. 2

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting  Gauge pressure = bar	Measurement  Gauge pressure = bar	diminution Control rod travel- difference mm (1)
	Gauge pressure - Dar	Gauge pressure - Dan	.,
PE 10 PLS 3073 RQV PA 549	0,55	0,90 0 0,39	11,2-11,3 11,6-11,7 9,4-9,5 10,1-10,3
			(i)

Notes:

(1) when n =

rev/min and gauge pressure =

# Testoil-ISO 4113

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# Test Specifications Fuel Injection Pumps (1) and Governors

WPP 001/4 RVI 8,8 d 3. | Edition

n

PES 6 P 120 A 320 RS 419 Z

RQV 250-1100 PA 540

supersed 40.81

company:RVI

engine: MIDR 06.20.3C 188 kW(256PS

1 - 5 - 3 - 6 - 2 - 4 je 60°

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke (2,75-2,95) mm (fr

Rotational speed rev/min	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm²/ 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm³/100 strokes 3	Spring pre-tensioning (torque-control varies) mm 6
1100	9,5-9,6	20,2 - 20,6	0,5(0,9)			
250	4,4-4,6	1,4- 2,0	0,8(1,2)			
		·				

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated s	peed	)		Intermediate	qe beten	bed	Lower rated	speed		Sliding	leave traval
deflection of control	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	(a)	Degrae of deflection of control lever	rev/min 5	Control ro travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm 3	rev/min	① mm
max.	1270	15,2-1	7,8				 ca.10	100 250	min. 6,0 4,4-4,6	500	0,8-1,0 3,5-3,6
ca.61	8,5 4,0 1350	1215-1	245				280 <b>-</b> 40	0		800 1100	4,8 <u>-</u> 4,9 6,9

Torque control travel a =

mm

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-rod Test oil tem	livery stop p. 40°C (104°F) 2	intermediate speed	0.00	ery characteristics (5e)	Starting Idle switching		Torque- travel	control (5)
rev/min 1	cfh <sup>3</sup> /1000 strokes	rev/min 44) 3	rev/min 4	cm <sup>3</sup> /1000 strokes	re //min	cm³/1000 strokes	rev/min	travel mm
	0,7 bar 202,0-206,0 (199,0-209,0)	1140-1150*	LDA 110 o	9 bar 142,0-146,0 (139,0-149,0)				

Checking values in brackets

\* 1 mm less control rod travel then col. 2

1.83

BOSCH

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PES 6 PRS 419Z	0,26		9,0 - 9,1
+ RQVPA 540		0,70	9,5 - 9,6
		0	7,4 - 7,5
		0,21	7,9 - 8,1
<b>19</b>			
·			

Notes.

(1) when n =

revimin and gauge pressure =

# **Test Specifications** Fuel Injection Pumps (A) and Governors

WPP 001/4 KHD 1q9

1. Edition:

En

PES 6 MW 100/720 RS 1013 RSV 325...1100 MW 8/310 komb. Nr.: 0 403 476 010 supersedes 5.81 company. KHD

BF 6 L 413 FR

DX 230 Tractor 147 KW bei 2200 min 1

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A: Fuel Injection Pump Settings 3,10 - 3,20 Port closing at prestroke (3,05 - 3,25)

Testoil-ISO 4113

 $_{\text{mm (from BDC)}}$ RW = 9,0 - 12,0 mm

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/miñ	mm 2	cm <sup>3</sup> /100 strokes	cm³/ 100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes	mm 6
1100	11,8+0,1	10,6 - 10,8	0,35(0,6)			
325	5,6-5,8	1,25- 1,65	0,35(0,55)			
900	12,4+0,1		0,5 (0,7)			
500	10,6+0,1		0,35(0,6)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Degree of	r rated speed Control rod travel	rev/min Control rod travel	interm	edia	te rated	speed	Control-		rated speed Control rod travel	11 3 1	rque control  Control rod  travel
deflection of control lever 1	mm 2	mm rev/min	4	5	<u>.                                    </u>	6	lever deflection in degrees 7	rev/min 8	mm 9	rev/min 10	mm ′
loose	800	0,3-1,0					ca. 18	325 100	5.2 min. 19	1100 900	11,8-11,9 12,4-12,5
ca : 50	1155-11	150 = 10,8 185 = 4,0 0,3-1,7						325 550- 610	5,6-5,8 2,0		

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

(2b) Full-load stop		6 Rotational- speed limitat	Starting f	uel delivery 5	4a Idle stop			
Test oil to rev/min 1	t oil temp 40°C (104°F) Note: changed to )		rev/min	cm³/1000 strokes 5	rev/min cm³/1000 strokes		rev/min Control rod travel mm 8 9	
LDA 1100	0,55 bar 106,0-108,0 (104,0-110,0)	1140-1150*	LDA 900 LDA 500	0,55 bar 114,5-118,5 (112,5-120,5) 0 bar 82,5-84,5 (80,5-86,5)	100 . 325	min. 120 12,5-16,5 (10,0-19,0	325 )	5,7

Checking values in brackets

\* 1 mm less control rod travel than col. 2

AA3

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travet- difference
	Gauge pressure = ba	Gauge pressure = bar	mm (1) .
RS 1013 +		0,4	11,9 - 12,0
MW 8/310		0,55	11,1 - 11,2

Notes.

(1) when n =

rev/min and gauge pressure =

# Test Specifications Fuel Injection Pumps (A) and Governors

40

WPP 001/4 DEE 7,6 a

1. Edition

<u>En</u>

PES 6 P 110 A 720 RS 361

RSV 400-1050 P2/478

súperseges John Deere company 6466 AR-06

engine 167 kW (227 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke (2,70-2,90)

Testoil-ISO 4113

mm (from BDC)

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm (2)	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> / 100 strokes	mm	cm³/100 strokes	mm
1	2	3	4	2	3	6
1050	11,5 +0,1	15,0-15,2	0,4 (0,8)			
400	6,2-6,3	1,2-1,8	0,4 (0,8)			7
				1		
					1	

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Degree of deflection of control lever	r rated speed Control rod travel mm		Intermed	liate rated	speed	Control- lever deflection in degrees 7	Lower rev/min 8	rated speed Control rod travel mm	3 To	rque control Control rod travel mm
loose	800 X =	0,3-1,0	-	•	-	ca.20	400 100	5,7 min.19,0	1050 650	11,5-11,6 12,3-12,4
ca.44	10,5 4,0 1280	1105-1115 1185-1215 0,3 -1,7					400 570-630 800	6,1-6,3 = 2,0 max. 1,0	500	8,4-8,5

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

	emp 40°C (104°F) cm <sup>3</sup> /1000 strokes	6 Rotational- speed limitat Note: changed to) rev/min rev/min 3 Fuel delivery characteristics  rev/min cm³/1000 strokes 5		Starting fuel delivery 5 4a idle stop lide  rev/min cm³/1000 strokes rev/min 6 7 9			Control rod	
LDA 1050	0,65 bar 150,0-152,0 (147,0-155,0)	1105-1115*	LDA 650 LDA 500	0,66 bar 162,0-166,0 (159,0-169,0) 0 bar 74,0-80,0 (71,0-83,0)	100	155,0-175	,0 400	6,2

Checking values in brackets

\* 1 mm less control rod travel than col 2

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	dim:nution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PES 6 PRS 361	0,67		11,5-11,6
+RSVP2/478		0,36	9,8- 9,9
			. — .

Notes:

(1) when n =

rev/min and gauge pressure =

estoil-ISO 4113

# **Test Specifications** Fuel Injection Pumps 2 WPP 001/4 KHD 15,8 g and Governors

2. Edition

PE10P110A920/5 LS 3073

RQ300/1150PA535

supersede 82

company: BF10L413F

265kW (360 PS)1 engine:

2050 min

bzw. 259 kW (352 PS) 2300- min

(Maxidyne)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

0-27-72-99-144-171-216-243-288-315° ±0.5° (±0.75°)

#### A. Fuel Injection Pump Settings

1-10-9-4-3-6-5-8-7-2

Port closing at prestroke

mm (from BDC)

mm 2	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> / 100 strokes 4	mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
11,6+0,1	13,8-14,0	0,4(0,8)			
6,9-7,1	1,8-2,4	0,4(0,7)			
•	2 11,6+0,1	11,6+0,1 13,8-14,0	mm cm <sup>3</sup> /100 strokes 100 strokes 2 3 4 11,6+0,1 13,8-14,0 0,4(0,8)	mm cm³/100 strokes 100 strokes mm 2  11,6+0,1 13,8-14,0 0,4(0,8)	mm cm³/100 strokes 100 strokes mm cm³/100 strokes 2 3 11,6+0,1 13,8-14,0 0,4(0,8)

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checkin PRG che	•	Full-load s Setting po	•	•	cifications (4)	Idle spec	_		cifications (5)	Torque o	control 3
rev/min	Control rod travel mm	r <del>ev</del> /min 3	Centrel red travel mm 4	Control red travel mm -	rev/min	rev/min	Contrel red travel rnm 8	rev/min 9	Control rod travel mm	rev/min 11	Control rod travel
700 VH=	19,2-20,9 max.46•	700	20,0	9,7 4,0 1350	1195-1205 1220-1250 0-1,0	300	7,0	100 300 340-	6,9-7,1	800 1020	10,7-10,9 11,6-11,7 11,5-11,7 11,2-11,4

Torque-control travel
on flyweight assembly dimension a =

Speed regulation: At

1 mm less control rod trr /el

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of governor of Test oil ter	letivery on control lever np. 40°C (104°F)	Control rod stop	Fuel delive	ery characteristics	Starting findle spee	ruel delivery 6
rev/min	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /~1000 strokes 5	rev/min 6	red travel cm <sup>3</sup> /1000 strokes:/ mm 7
LDA 800	0,9 bar 138,0-140,0 (135,0-143,0)	<b>-</b>	LDA 500	0 bar 85,0-89,0 (82,0-92,0)	100	115,0-140,0

Checking values in brackets

1.83

**BOSCH** AA7

Geschäftsbereich KH. Kundendienst. Kfz-Ausrüstung.

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Test at n =

500

rev/min decreasing pressure – in bar gauge pressure

Pump/governor	Setting		Measurement	diminution Control rod travel- difference
	Gauge pressure =	bar	Gauge pressure = bar	mm (1) .
PE10PLS3073 + PA535	0,55		0,90	11,2-11,3 11,6-11,7
			0 0,39	9,4-9,5
			•	

Notes:

(1) when n =

rev/min and gauge pressure =

Testoil-ISO 411

# Test Specifications Fuel Injection Pumps (2) and Governors

40

WPP 001/4 DAF 11,6 n 3

En

PE 6 P 110 A 320 RS 407-1

RQ 250/1100 PA 428/2 R

raupersedes

company: DAF

engine: DKTL 1160

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port Closing at prestroke

(2,75-2,95)

mm (from BDC) = RW 9.0 - 12.0 mm

Rotational speed rev/min	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes	Difference cm³/ 100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
850	12,3+0,1	13.9-14.1	0,4 (0,8)			
250	7,1-7,3	1,1-1,5	0,4 (0,7)			
	,					

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Checkine PRG che		Full-load s	•	•	cifications (4)	Idle spec	•		cifications (5)	Torque o	control 3
rev/min	Control rod	rev/min	Central red travel mm	Control red travel	rev/min 6		Centrel red travel		Control rod travel mm		Control rod travel mm
600	15,6-16,4	600	16,0	11,3 4,0 1350	1145-1160 1200-1230 0 - 1,0		7,2	100 250 345-	min. 7,3 7,1-7,3 385 = 2,0	850 1100	12,3+0,1 12,2+0,2
	<u> </u>							4445	1460 min=1		

Torque-control travel on flyweight assembly dimension a =

mm

Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

governor	delivery on control lever mp. 40°C (104°F)	Control rod stop 3a	Fuel deliv		Starting for Idle spee	Contree
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	red travel crm <sup>3</sup> /1000 strokes:/ mm 7
LDA 850	0,5 bar 139,0-141,0 (136,0-144,0)	<b>-</b>	LDA 600	0 bar 135,0-138,0 (132,0-141,0)	100	245,0-285,0 = 19,5-21,0 mm RW

Checking values in brackets

12.82

**BOSCH** 

Test at n =

600

rev/min decreasing pressure – in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
PE6PRS407-1	0,30		12,1 - 12,2
+ RQPA 428/2R		0,50	12,3 - 12,4
		0	12,0 - 12,1

Notes:

(1) when n =

rev/min and gauge pressure =

# Testoil-ISO 4113

# **Test Specifications** Fuel Injection Pumps 1 WPP 001/4 SCA 11,0 r 5 and Governors

PE 6 P 110 A 720 RS 3040

RQV 250-1000 PA 555

supersedes 81 company Scania DS 11

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings
3,3-3,4
Port closing at prestroke (3,25-3,45) mm mm (from 80C) RW 9.0 - 12.0 mm

Rotational speed rev/min	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	13,6+0,1	17, 1 - 17,3	0,4(0,8)			
225	4,2-4,4	0,9 - 1,3	0,2(0,4)			

Adjust the fuel delivery from each outlet according to the values in [

#### **B.** Governor Settings

Upper rated	speed		Intermediate	rated sp	eed	Lower rated	speed		Sliding s	leeve travel
deflection of control	rev/min Control rod travel		of control		Control rod travel	Degree of deflection of control		Control rod travel		0
lever 1	mm 2	rev/min (28 3	lever 4	rev/min 5	mm (4)	lever 7	rev/min 8	mm (3) 9	rev/min 10	11
max.	1050 1300	15,2-17,8 0 - 1,0	-	-	-	ca. 9		min.5,7 4,2-4,4	200 470	1,0-1,2 3,5-3,9
ca.60	12,6 4,0	1040-1050 1140-1170				250-355			730 1000	5,2-5,4 8,0
						<b>3</b>				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load di Control-roi Test oil ten				Fuel delivery characteristics (5a) high ide speed (50)			fuel delivery 6	Torque- travel	control 5
rev/min	cm <sup>3</sup> /1000 strokes .	rev/min (	9 6	v/min	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes	rev/min	travel mm
LDA 1000	0,7 bar 171,0-173,0 (168,0-176,0)	1040-1050	6 L	DA 500 .DA 500	0,7 bar 168,0-171,0 (165,0-174,0) 0 bar 127,0-131,0 (124,0-134,0)	100	220,0-270,0 20,0- 21,0 mm RW	-	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

-2-

Test at n =

500

rev/min increasing pressure - in bar gauge pressure XXXXXXX

SCA 11,0 r 5

Pump/governor	Setting	Measurement	diminution Control rod ####XXX
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
RS 3040 +	0,7		13,6 - 13,7
PA 555	0,1	0,41	13,1 - 13,3
		0,26	12,3 - 12,4
		0	11,9 - 12,0

Notes:

(1) when n =

rev/min and gauge pressure =

Testoil-ISO 4113

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 VOL 12,0 f 4 ·1. Edition

PE6P120A320RS3071Z.

ROV 250-1025 PA 371

company: VOTVO

TD 120 G/USA

243 kW (330 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm 2	cm <sup>3</sup> /100 strokes	100 strokes	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6
700	11,4+0	1 20,6-20,9	0,5(0,9)			
250	5,3-5,	2,2 - 2,6	0,3(0,6)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated s	Upper rated speed Intermediate re						Lower rated	speed		Sliding s	leeve travel
	rev/min Control	Control rod travel	$\odot$	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel		$\odot$
of control	rod travel		(2)	of control lever	rev/min	mm 🕒	of control lever	rev/min	тт 3	rev/min	ď
1	2	3		4	5	6	7	8	9	10	11
max.	1100	15,2-17	,8	-	-	-	ca. 12	100	min.7,0	200	0,7-0,9
ca. 4	2 10,4 4,0 1300		75						5,3-5,5 360=2,0	475 750 1025	2,8-3,1 4,8-5,1 7,2
							<b>②</b>				

Torque control trevel a =

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc Test oil ten	stop	Rotational-speed 2b limitation intermediate speed	Fuel delivinghide s	ery characteristics (56) peed (30)	Starting idle switchir	. 0	Torque- travel	Control Control rod
rev/min	cm³/1000 strokes	rev/min 40	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm¥1000 strokes	rev/min	
1	2	3	4	5	6	7	8	9
LDA 700	0,9 bar 206,0-209,0 (203,0-212,0		LDA 700	0 bar 176,0-180,0 (173,0-183,0		240,0-280,0 =RW 20,0 21,0 mm	-	-

Checking values in brackets

1 mm less control rod travel then col. 2

Test at n =

500

ev/min decreasing pressure - in ber gauge pressure

VOL 12,0 f 4

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE6PRS3071Z + RQV PA 371	0,45	0,90 0 0,28	11,0-11,1 11,4-11,5 9,7- 9,8 10,1-10,3
·			

Notes:

(1) when n =

rev/min and gauge pressure =

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 IHC 7,6 b 1
1. Edition

Eη

Nozzle-and-holder assembly 1 683 901 016 (207 + 3 bar)

PES 6 MW 100/320 RS 1107 RQV 350-1200 MW 43

0 40 3 446 135

Testoil-ISO 4113

supersedes

company IHC - USA

engine DTC 466 B

121,3 kW (165 PS)

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at pres	troke	4,00-4,10 mm (from BOC) RW = 9.0 - 12.0 mm								
Rotational speed		Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)				
rev/min	mm 2	cm <sup>3</sup> /100 strokes 3	cm <sup>3</sup> / 100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6				
800	11,1+0,1	8,4 - 8,6	0,35(0,6)			1				
350 1200	5,9-6, 11,1+0,		0,35(0,55 0,65(0,7)	1						
500	9,8+0,	Į.								

Adjust the fuel delivery from each outlet according to the values in

**B.** Governor Settings

Upps: rated s	peed			Intermediate	rated sp	bed		Lower rated	speed		Sliding sl	esve travel
Degree ov deflection	rev/min	Control mell travel mm rev/min	9	Degree of deflection of control lever	r <del>ev/min</del> S	Control rod travel mm (6	<b>①</b>	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 3 9	rev/min	mm 11
max.	8,0 0 - 1	1355-13 1450	95	-	-	-		ca. 14	100 350	min.9,0 5,9-6,1		
ca.60,5	4,0	1365-13	75			,		370-650 ③				

Torque control travel a \*

THE R

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-rod Test oil terr	livery I stop up. 40°C (104°F) (2)	Rotational-speed (20) irritation intermediate speed	Fuel delivingh ide s	ery cherecteristics (5a) peed (3b)	Starting lidle switching		pravel Torque	Control ro
rev/min		rev/min 49	rev/man	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm*Y1000 strokes 7	rev/min 8	9
LDA 800	0,9 bar 84,0-86,0 (82,0-88,0)		LDA 1200 LDA 500	0,9 bar 86,5-90,5 (84,5-92,5) 0 bar 61,5-63,5 (59,5-65,5)	100 220-2	19.0-21,0 mm RW 140-180 280(210-290)		

Chucking values in brackets

\* 1 mm less control rod travel than col. 2

-2-

Test at	. =

500

rev/min decreasing pressure - in bar gauge pressure

IHC 7,6 b 1

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure =	bar Gauge pressure =	bar mm (1) .
RS 1107 RQV MW 43	0,3	0,9 0 0,13	10,8 - 10,9 11,1 - 11,2 9,8 - 9,9 10,1 -10,2

Notes

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

#### Please note:

- Carry out pump adjustment only with overflow valve 1 417 413 040 and IH hose with throttle 1.57 mm diameter.
- Set locking device before testing position of sliding device.
- In unlocked condition do not operate at a speed higher than  $n = 500 \text{ min}^{-1}$ .
- Set lower idle speed at stop screw.
- Set shutoff stop 1.5 2.0 mm in front of the stop.

# Test Specifications Fuel Injection Pumps (1) and Governors

WPP 001/4 IHC 7,6 a 1

1. Edition

PES 6 MW 100/320 RS 1103

RQV 350-1300 MH 43

0 403 446 131

Testoil-ISO 4113

company IHC
-engine DT 466 B
154,5 kW (210 PS)

Nozzle-and-holder assembly 1 688 901 016 (207 + 3 bar)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at pres		,00-4,10 95-4 15)	mm (from BOC)	RW = 9.0	) - 12.0 mm	
Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery , cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
900	11,9+0,1	10,3 - 10,5	0,35(0,6			
350	6,0-6,2	1,6 - 2,0	0,35(0,5	•)		
1300	11,9+0,1		0,65(0,7			
500	9,6+0,1					

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated :	speed		Intermediate	rated sp	eed	Lower rated	speed		Stiding s	leeve travel
Degree of deflection	rev/min Control	Control rod travel	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel		$\odot$
of control	rod travel	mm rev/min (2)	of control lever	ten/wn	mm (4)	of control lever	rev/min	тт (3)	LeA/LINU	mm
1	2	3	4	5	6	7	8	9	10	11
max.	8,0	1440-1505	-	-	-	ca. 14	100	min.9,0		
	0 - 1	1600					350	<sup>1</sup> 6,0-6,2		
ca.62,			T		:	70-650				
	4,0	1475-1485				<b>③</b>		·		

Torque control travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control red Test oil ton		Rotational-speed 20 imitation intermediate speed		very characteristics (5e) peed (5e)	Starting Idle switchin		Torque- travel	control 5
rev/min	crit <sup>3</sup> /1000 strokes	rev/min 4a	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	travel mm
1	2	3	4	5	6	7	P	9
LDA 900	0,9 bar 103,0-105,0 (101,0-107,0)		LDA 1300 LDA 500	0,9 bar 107,0-111,0 (105,0-113,0) 0 bar 63,5-65,5 (61,5-67,5)		19 - 21 mm RW 140 - 180 280(210-290)		

Checking values in brackets

\* 1 mm less control rod travel then col 2

Testatn =

500

rev/min decreasing pressure - in bar gauge pressure

IHC 7.6 a 1

-2-

Pump/governor	Setting	Measurement	diminution Control rod travel-
	Gauge pressure = bar	Gauge pressure = bar	difference mm (1)
RS 1103 + RQV MW 43	0,51	0,9 0 0,28	11,3 - 11,4 11,9 - 12,0 9,6 - 9,7 10,4 - 10,5

Notes

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

#### Please note:

- Carry out pump adjustment only with overflow valve 1 417 413 040 and IH hose with throttle 1.57 mm diameter.
- Set locking device before testing position of sliding device.
- In unlocked condition do not operate at a speed higher than  $n = 500 \text{ min}^{-1}$ .
- Set lower idle speed at stop screw.
- Set shutoff stop 1.5 2.0 mm in front of the stop.

Testoil-ISO 4113

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 IHC 7,6 C 1. Edition

••

PES 6 MW 100/320 RS 1103 RQV 350-1300 MW 43-1 G 403 446 132 supersedes\_

company: IHC-USA

engine: DT 466 B

143,4 kW (195 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at pres	stroke	4,00-4,10 (3.95-4.15)	mm (from BDC)	RW = 9	0-12,0 mm	
Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	cm³/ 100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
900	12,9+0,1	9,55-9,75	0,35(0,6)			
350	5,7-5,8	1,6 - 2,0	0,35(0,55	)		
1300	10,9+0,1		0.65(0.7)			
500	9,4-9,4		0,65(0,7)	1		
	1	I	1	I	1	1

Nozzle-and-holder assembly 1 688 901 016 (207 + 3 bar)

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated s	peed		Intermediate	rated sp	<del>oe</del> d	Lower rated	speed		Sliding sleeve travel	
deflection of control	rev/min Control rod travel mm 2		Degree of deflection of control lever	rev/min 5	Control rod travel mm 4	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 3	rev/min	mm 11
max.	8,0 0-1	1355-1395 1500	-	-	-	ca. 13	l	min. 9,0 5,8-6,0		
ca.61,5	4,0	1457-1467			360-700	<b>3</b>		5,5 · 0,0		

Torque control travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of Control-ro Test of te		Rotational-speed (20) limitation intermediate speed	Fuel delin high idle s	rery characteristics (5e peed (5)	Starting Idle switching		Torque- travel	Control rod
rev/min	cm³/1000 strokes .	rev/min 44	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	(BA)UMU	travel mm
1	2	3	4	5	6	7	8	9
LDA 900	0,9 bar 95,5-97,5 (93,5-99,5)		LDA 1300 LDA 500	(94,5-102,5) 0 bar 63,5-65,5	100 220-2	19-21 mm RW 140-180 80 (210-290)		

Checking values in brackets

\*1 mm less control rod travel than col. 2

-2-

restatn = 500	rev/min decreasing pressure - in increasing	bar gauge pressure	IHC 7,6 c
Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
RS 1103 +	0,4		10,5 - 10,6
RQVMW 43-1	,,	0,9	10,9 - 11,0
		0	9,4 - 9,5
		0,19	9,8 - 9,9
		and the second s	

Notes. (1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

#### Please note:

- Carry out pump adjustment only with overflow valve 1 417 413 040 and IH hose with throttle 1.57 mm diameter.
- Set locking device before testing position of sliding device.
- In unlocked condition do not operate at a speed higher than  $n = 500 \text{ min}^{-1}$ .
- Set lower idle speed at stop screw.
- Set shutoff stop 1.5 2.0 mm in front of the stop.

# **Test Specifications** Fuel injection Pumps 1 and Governors

WPP 001/4 IHC 7,6 e

Edition

supersedes

PES 6 MW 100/320 RS 1108 ROV 350-1200 MW 43-3

0 403 446 137

Testoil-ISO 4113

Nozzle-and-holder assembly 1 688 901 016 (207 + 3 bar) companyIHC-USA engine DT 466 B 132,4 kW (180 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings 3 00-3 10

Port closing at pres	stroke	(2.95-3.15)	mm (from BDC)	RW=9.0-	12.0 mm	
Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
800	11,5+0,	9,05-9,25	0,35(0,6)			
350	6,2-6,	1,6-2,0	0,35(0,55	)		
1200	11,5+0,		0,65(0,7)	ļ		
500	10,0+91					
		<u> </u>		<u> </u>	<u> </u>	

Adjust the fuel delivery from each outlet according to the values in [

#### **B. Governor Settings**

Upper rated s	Upper rated speed Intermediate rated speed			eed	Lower rated	speed		Sliding sleeve travel		
deflection of control	rev/min Control rod travel mm 2	Oontrol rod travel mm rev/min 2a	of control	rev/min 5	Control rod travel mm 4	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 3	rev/min 10	1) mm 11
max.	8,0 0,1	1360-1400 1450	-	-	-	ca. 17	1	min. 9,0 6,2-6,3		
ca.60,5	4,0	1380-1390				370 <b>-</b> 650				

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of Control-ro Test oil ter		Rotational-speed 20 Imitation intermediate speed			Starting fuel delivery 6 Idle switching point		Torque- travel	control (5)
rev/min	cm³/1000 strokes	rev/min 4a	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes .	rev/min	mm
1	2	3	4	5	6	7	8	9
LDA 800	0,9 bar 90,5-92,5 (88,5-94,5		LDA 1200 LDA 500	(91,0-99,0) 0 bar 60,0-62,0	100 220-2	19-21 mm RW 140,0-180,0 280(210-290)		

Checking values in brackets

\* 1 mm less control rod travel than col. 2

rev/min decreasing pressure – in bar gauge pressure Test atn = 500 IHC 7,6 e Measurement diminution Setting Pump/governor Control rod travel difference Gauge pressure = bar നന (1) Gauge pressure = RS 1108 + 11,1 - 11,2 11,5 - 11,6 10,0 - 10,1 10,3 - 10,4 ROV.. MW 43-3 0,42 0,9 0 0,19

Notes

(1) when n =

rev/min and gauge pressure = bar (= maximum full-load control rod travel)

-2-

#### Please note:

- Carry out pump adjustment only with overflow valve 1 417 413 040 and IH hose with throttle 1.57 mm diameter.
- Set locking device before testing position of sliding device.
- In unlocked condition do not operate at a speed higher than  $n = 500 \text{ min}^{-1}$ .
- Set lower idle speed at stop screw.
- Set shutoff stop 1.5 2.0 mm in front of the stop.

# **Test Specifications** Fuel Injection Pumps 1 WPP 001/4 IHC 7.6. f and Governors

1. Edition

PES 6 MW 100/320 RS 1108 ROV 350-1300 MW 43-4 0 403 446 138

supersedes

company: IHC

engine. DT 466 B

154,5 kW (210 PS)

Nozzle-and-holder assembly 1 688 901 016 (207 + 3 bar)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at pres		2 95_3 15)	mm (from BDC)	V = 9.0-1	2.0 mm	
Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm	cm³/100 strokes	100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
900	12,6-0,1	10,7-10,9	0,35(0,6)			
350	6,5-6,6	1,6-2,0	0,35(0, <b>5</b> 5	}		
1300	12,6+0,1		0,65(0,7)			
500	9,6+0,1					

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated s	peed		Intermediate	rated sp	eed	Lower rated	speed		Sliding s	leeve travel
deflection	rev/min Control rod travel	travel 🕒	Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel		0
	mm	rev/min (2s)	lever	rev/min	mm (4)	lever	rev/min	mm (3	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
max.	8,0	1440-1505	-	-	-	ca. 16	100	min.9,0		
	0-1	1580					350	6,1-6,2		
ca.61,	4,0	1500-1510				370-650 ③				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc Test oil terr		Rotational-speed 20 limitation intermediate speed			Starting idle switchir		Torque- travel	control 5
rev/min	cfh³/1000 strokes	rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	travel mm
LDA 900	0,9 bar 107,0-109,0 (105,0-111,0)		LDA 1300	0,9 bar 112,5-116,5 (110,5-118,5)	100	19-21 mm RW		
			LDA 500	0 bar 53,5-55,5 (51,5-57,5)		140-180 80(210-290)		

Chucking values in brackets

\* 1 mm less control rod travel than col. 2 12.82

Testoil-ISO 4113

restatn = 500	rev/min decreasing pressure - in increasing	bar gauge pressure	-2- IHC 7.6 f		
Pump/governor	Setting	Measurement	d:minution Control rod travel- difference		
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .		
RS 1108 + RQV MW 43-4	0,57	0,9 0 0,27	11,9-12,0 12,6-12,7 9,6-9,7 10,4-10,5		
	•				

Notes

(1) when n =

rev/min and gauge pressure = bar (= maximum full-load control rod travel)

#### Please note:

- Carry out pump adjustment only with overflow valve 1 417 413 040 and IH hose with throttle 1.57 mm diameter.
- Set locking device before testing position of sliding device.
- In unlocked condition do not operate at a speed higher than  $n = 500 \text{ min}^{-1}$ .
- Set lower idle speed at stop screw.
- Set shutoff stop 1.5 2.0 mm in front of the stop.

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 IHC 7,6d
1. Edition

n

PES 6 MW 100/320 RS 1107 RQV 350-1200 MW 43-2 0 403 446 136

Testoil-ISO 4113

supersedes

company: IHC-USA

engine: DT 466 B

132,4 kW (180 PS)

03 446 136 Nozzle-and-holder assembly 1 688 901 016 (207 + 3 bar)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Rotational speed	Control rod	Fuel delivery	mm (from BDC)	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min 1 .	mm 2	cm <sup>3</sup> /100 strokes 3	cm <sup>3</sup> / 100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6
800	11,8+0,1	9,45-9,65	0,35 (0,6			
350	5,9-6,1	1,6 - 2,0	0,35 (0,5	5)		
1200 500	11,8-11, 10,4-10,		0,65 (0,7			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated s	peed		Intermediate	rated sp	ed	Lower rated speed			Sliding sleeve travel	
	rev/min Control rod travel mm 2	Control rod travel mm rev/min 28	Degree of deflection of control lever	rev/min 5	Control rod travel mm 4	Degree of deflection of control tever	rev/min	Control rod travel mm 3	rev/min	1) mm
max.	8,0 0-1	1355-1395 1500	-	-	•	ca.15		min.9,0 5,9-6,1		
ca.61,5	4,0	1375-1385				370-650 ③				

Torque control travel a =

mr

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-ros Test oil ten		Rotational-speed (20) limitation intermediate speed	(3)		Starting Idle switching	•	Torque- travel	Control rod
rev/min	cm <sup>3</sup> /1000 strokes	rev/min 4	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	2000
1	2	3	4	5 ^	6	7	8	9
LDA 800	0,9 bar 94,5-96,5 (92,5-98,5)		LDA 1200 LDA 500	0,9 bar 96,8-100,0 (94,0-102,0) 0 bar 70,0-72,0 (68,0-74,0)	100 220-2	19,0-21,0 mm RW 140-180 280 (210-290)		

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting .	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
RS 1107			
RQVMW 43-2	0,39		11,5 - 11,6
		0	10,4 - 10,5
		0,9	11,8 - 11,9
		0,17	10,7 - 10,8
, i			

Notes:

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

#### Please note:

- Carry out pump adjustment only with overflow valve 1 417 413 040 and IH hose with throttle 1.57 mm diameter.
- Set locking device before testing position of sliding device.
- In unlocked condition do not operate at a speed higher than  $n = 500 \text{ min}^{-1}$ .
- Set lower idle speed at stop screw.
- Set shutoff stop 1.5 2.0 mm in front of the stop.

WPP 001/4 IHC 7,6 g

1. Edition

PES 6 MW 100/320 RS 1108 RQV 350-1200 MW 43-5 0 403 446 139

(1)

Testoil-ISO 4113

company: IHC

engine: DT 466 B 121,4 kW (165 PS)

Nozzle-and-holder assembly 1 688 901 016 (207 + 3 bar)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Rotational speed	Control rod travel	2,95-3,15) Fuel delivery	Difference	Control rod	0 - 12.0 mm Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min 1	mm 2	cm <sup>3</sup> /100 strokes	cm³/ 100 strokes 4	mm	cm <sup>3</sup> /100 strokes	mm 6
800	10,6+0,1	8,5-8,7	0,35(0,6			
350 1200 500	5,8-5,9 10,6+0,1 9,2-9,3		0,35(0,5 0,65(0,7	i		

Adjust the fuel delivery from each outlet according to the values in

# **B.** Governor Settings

Upper rated s	peed			Intermediate	rated spe	eed	Lower rated	speed		Sliding s	ieeve travel
deflection of control	rev/min Control rod travel mm	Control rod travel mm rev/min	(a)	Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel	rev/min	① mm
1	2	3		4	5	6	7	8	9	10	11
max.	8,0	1360-14	100	-	-	-	ca.14	100	min.9,0		
	0-1	1460						350	5,8-5,9		
ca.58,5	4,0	1360-1	370				360-640				

Torque control travel a =

mm

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of Control-roo Test oil ten		limitation intermediate speed	Fuel delivery characteristics (5e) high ide speed (5b)		Starting Idle switchin		Torque- travel	Control rod
rev/min	cm³/1000 strokes	rev/min 40	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	mm
LDA 800	0,9 bar 85,0-87,0 (83,0-89,0)		LDA 1200 LDA 500	0,9 bar 90,5-94,5 (88,5-96,5) 0 bar 59,0-61,0 (57,0-63,0)		19-21 mm RW 140-180 280 (210-290)	8	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

# D. Adjustment Test for Manifold Pressure Compensator

Test at n =

500

rev/min decreasing pressure – in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
RS 1108 RQV., MW 43-5	0,42		10,2 - 10,3
		0,9	10,6 - 10,7
		0	9,2 - 9,3
		0,18	9,5 - 9,6

Notes.

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

#### Please note:

- Carry out pump adjustment only with overflow valve 1 417 413 040 and IH hose with throttle 1.57 mm diameter.
- Set locking device before testing position of sliding device.
- In unlocked condition do not operate at a speed higher than  $n = 500 \text{ min}^{-1}$ .
- Set lower idle speed at stop screw.
- Set shutoff stop 1.5 2.0 mm in front of the stop.

WPP 001/4 MB 3.0 p

2. Edition

En

PES 5 M 55 C 320 RS 108

RSF 350/2300 M 16

Komb. Nr. 0 400 075 994 | Sales model

0 400 075 993

supersedes 81 company Daimler Benz

OM 617

65 KW (88 PS)

1-2 - 4 - 5 -3

A TO Sep 14 Man 216 at 288 u for Boach Fuel Mar 250 Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at prestroke

2,20-2,30 (2,15-2,35)

mm (from BDC)

20 mm

Control rod travel

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (compensating valve)
rev/min	mm 2	cm <sup>3</sup> /100 strokes	cm³/100 strokes	mm 2	cm <sup>3</sup> /100 strokes	6 6
1000	13,9+0,1	3,9-4,0	,25(0,3)			
350 1800 2200	6,5-6,7	0,6-0,7	0,1(0,15) 0,25(0,3) 0,25(0,3)			
				•		

Set uniform delivery according to the values in

Checking values in brackets

# **B.** Governor Settings

Lower rated spe Degree of deflection of control lever	Control rod travel		Upper rated sp Degree of deflection of control lever		Fiotational speed rev/min 6	1		Control rod travel mm
9-13 (1) (2) (3) (4) (5)	min.10, max.10, 6,5-6,7	p 300	50 (8) (9) (10) (11)	0-1,0	2 2200 5 2500 - 2950	(12) (13) (14) (6)	1 1 (1(1(1))	min.20,3 13,5-13,7 13,9-14,0

# C. Settings for Fuel Injection Pump with Governor Mounted

Full-load de	elivery (19)	Full-load speed (8a) regulation	Variations delivery		Starting full	iel delivery	Difference
Test oil ten	np 40°C (104°F) cm³/1000 strokes	rev/min	rev/min	(18) crn³/1000 strokes 5	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
2200	39,5-41,5 (38,5-42,5)	2500 * RW 9,1-9,5	1800	39,0-41,0 (38,0-42,0) 39,0-40,0 (38,0-41,0)	100 350 2500	min. 53,0 6,0-7,0 (5,5-9,0) 23,0-27,0 (22,0-28,0)	1,0 1,5 2,5 see 3,0 point 8a

Checking values in brackets

Ca ffn 自然文明troi rod travel than in Column 2

- 1. \*\* Set the idle auxiliary spring at  $n = 385 \text{ min}^{-1}$  so that the control-rod travel is exceeded by 0.1 0.2 mm.
- 2. Setting the idle control-lever position:

  At 1000 min<sup>-1</sup>, control rod travel 1.9 2.0 mm
- 3. Check the idle auxiliary spring shutoff

Control-lever position 47°. After change-over point up to 550 min<sup>-1</sup> no change in control-rod travel. Control-lever position 30°. Speed range 350 min<sup>-1</sup> - 450 min<sup>-1</sup>

4. Check the pneumatic shutoff box

Control lever at idle stop. At  $n=375~\text{min}^{-1}$  and pu=450~mbar (vacuum) (338 mmHg) the control rod must return quickly to control-rod travel = 0 mm.

WPP 001/4 MB 3.0 o

2. Edition

En

PES 5 M 55 c 320 RS 108

RSF 350/2300 M 15

supersedes 1.81

company Daimler-Benz

OM 617

Komb.Nr. 0 400 075 995 Sales model

0 400 075 992

1-2 -4 -5 -3

Authors spenifications for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at prestroke

2,20-2,30 (2,15-2,35)

mm (from BDC)

Control rod travel

20 mm

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (compensating valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> /100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
1000	13,9+0,1	3,9-4,0	0,25(0,3)			
350 1800 2200	6,5-6,	0,6-0,7	0,1(0,15) 0,25(0,3) 0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

# **B.** Governor Settings

Lower rated sp	eed		Upper rated spe	eed		Variations in co	ntrol rod trave	el
Degree of deflection of control	Control rod travel	Rotational speed		Control rod travel	Rotational speed		Rotational speed	Control rod travel
lever	mm	rev/min		mm	rev/min		rev/min	mm
1	2	3	4	5	6	7	8	9
9-13 (1) (2) (3) (4) (5)	min.10, max.10, 6,5-6,7	0 300	50 (7) (8) (9) (10)	13,0-13 9,1-9, - 0,1,0		(12) (13) (14) (6)	100 1800 1000 Switching po	min.20,3 13,5-13,7 13,9-14,0

# C. Settings for Fuel Injection Pump with Governor Mounted

Full-load de	elivery (19) np 40°C (104°F)	Full-load speed (8a) regulation	Variations delivery	in fuel (17)	Starting fo	uel delivery	Difference
rev/min 1	cm²/1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	cm <sup>3</sup> /1000 strokes 8
2200	39,5-41,5 (38,5-42,5)	2500* RW=9,1-9,5	1800	39,0-41,0 (38,0-42,0)	100	min. 53,0	6,0 123
	(30,3-42,3)		1000		350	6,0-7,0 (5,5-9,0)	1,0 (1,5) see (15) 2,5 point
					2500	23,0-27,0 (22,0-28,0)	2,5 point (

Checking values in brackets

Ca 1 mm less control rod travel than in Column 2

12.82

BOSCH

indendienst. Kfz-Ausrustung GmbH, Postfach 50, D-7000 Stuttgart 1. Printed in the Federal Republic of Germany Fa-tarola d'Allamadna par Robert Bosch GmbH

- 1. \*\* Set the idle auxiliary spring at n = 385 min<sup>-1</sup> so that the control-rod travel is exceeded by 0.1 0.2 mm.
- Setting the idle control-lever position:
   At 1000 min<sup>-1</sup>, control rod travel 1.9 2.0 mm
- Control-lever position 47°. After change-over point up to 550 min<sup>-1</sup> no change in control-rod travel. Control-lever position 30°. Speed range 350 min<sup>-1</sup> 450 min<sup>-1</sup>
- 4. Check the pneumatic shutoff box

Control lever at idle stop. At  $n = 375 \text{ min}^{-1}$  and pu = 450 mbar (vacuum) (338 mmHg) the control rod must return quickly to control-rod travel = 0 mm.

**Festoil-ISO 4113** 

# Test Specifications **Fuel Injection Pumps** and Governors

WPP 001/4 MB 2,0 h

2. Edition

En

Sales model 0 400 074 975

PES 4 M 50 C 320 RS 103

RSF 375/2250 M 20

Komb. Nr. 0 400 074 976, 1-3-4-2=0 - 90-180-270 -0,5 (0,75)°

supersed 10.81

companyDaimler Benz

engine OM 615 42,7 kW (58 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at prestroke

1,70 - 1,80 (1,65 - 1,85)

mm (from BDC)

20mm

Control rod travel

Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (compensating valve)
mm	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> /100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
2	3	4	2	3	6
11,9+0,1	2,95-3,05	0,25(0,3)			
6,9-7,1	0,65-0,75	0,10(0,15)			
	travel mm 2 11,9+0,1	travel mm cm³/100 strokes 2 3  11,9+0,1 2,95-3,05	travel mm cm³/100 strokes 2 cm³/100 strokes 4  11,9+0,1 2,95-3,05 0,25(0,3)	travel   travel   travel   travel     travel     travel     travel     travel     travel     travel     travel     travel     travel     travel     travel     travel     travel     travel     travel	travel   travel   travel   travel   travel   trav

Set uniform delivery according to the values in

Checking values in brackets

# **B.** Governor Settings

Lower rated sp	eed		Upper rated	spe	ed		Variations in co	ntrol rod trav	el
Degree of deflection of control	Control rod travel	Rotational speed	Degree of deflection of control		Control rod travel	Rotational speed		Rotational speed	Control rod travel
lever	mm	rev/min	lever		mm	rev/min		rev/min	mm
1	2	3	4		5	6	7	8	9
3	min.12, 6,9-7,1 **		50 (	7 8 9 10	0,0-1,0	2500	(2)	1900	min. 20,3 11,4-11,6 11,9-12,0
( <u>4</u> )	1 2.5	720-820		0	-	•	6	Switching p	oint

# C. Settings for Fuel Injection Pump with Governor Mounted

Full-load de	elivery (19)	Full-load speed (8a) regulation	Variations delivery		Starting fulldle	uel delivery	Difference
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min		rev/min	cm³/1000 strokes 7	cm <sup>3</sup> /1000 strokes 8
2200	31,5-33,5 (30,5-34,5)	2500* RW 8,1-8,5	1900 1000	32,0-34,0 (31,0-35,0) 29,5-30,5 (28,5-31,5)	375	min. 55,0 6,5-7,5 (5,5-9,0) 17,0-21,0 (16,0-22,0)	6,0 1,0 1,5 2,5 see (15) 3,0 point 8a

Checking values in brackets

1 gamess control rod travel than in Column 2

- 1. \*\* Set the idle auxiliary spring at n = 400 min<sup>-1</sup> so that the control-rod travel is exceeded by 0.1 0.2 mm.
- 2. Setting the idle control-lever position:

  At 1000 min<sup>-1</sup>, control rod travel 1.9 2.0 mm
- Control-lever position 47°. After change-over point up to 550 min<sup>-1</sup> no change in control-rod travel. Control-lever position 30°. Speed range 350 min<sup>-1</sup> 450 min<sup>-1</sup>
- 4. Check the pneumatic shutoff box

Control lever at idle stop. At  $n=375~\text{min}^{-1}$  and pu=450~mbar (vacuum) (338 mmHg) the control rod must return quickly to control-rod travel = 0 mm.

Testoil-ISO 4113

# **Test Specifications Fuel Injection Pumps** and Governors

WPP 001/4 MB 2.4 m 3. Edition

En

PES 4 M 55 c 320 RS 107 RSF 375/2250 M 17

supersede9.81

company Daimler-Benz

engine: OM 616

Komb.Nr. 0 400 074 982 | Sales model

0 400 074 980

53 kW (72 PS)

1-3 - 4 - 2 All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers 0-90-180-270

# A. Fuel Injection Pump Settings

Port closing at prestroke

2,20-2,30 (2,15-2,35)

mm (from BDC)

20 mm

Control rod travel

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (compensating valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> /100 strokes	mm	cm³/100 strokes	mm
1	2	3	4	2	3	6
1000	13,9 <sup>+0</sup> ,	3,9-4,0	0,25(0,3)			
375 1800 2200	6,5-6,	7 0,6-0,7	0,1(0,15) 0,25(0,3) 0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

# B. Governor Settings

Lower rated spi	eed		Upper rated spe	ed		Variations in co	ntrol rod trave	el .
	Control rod travel	Rotational speed	Degree of deflection of control	Control rod travel	Rotational speed		Rotational speed	Control rod travel
lever	mm	rev/min	lever	mm	rev/min		rev/min	mm
1	2	3	4	5	6	7	8	9
9-13 () (2) (3) (4)	min.11, max.11, 6,5-6,7 **	0 300	50 (7) (8) (9) (10)	_		(12) (13) (14)	100 1800 1000 Switching po	min.20,3 13,3-13,5 13,9-14,0
(5)	2,5	120-020	(1)	•	-	6		

# C. Settings for Fuel Injection Pump with Governor Mounted

Full-load de	elivery (19)	Full-load speed 8a regulation	Variations delivery	in fuel 17	Starting fo	uel delivery	
Test oil tem	p 40°C (104°F)			18			Difference
rev/m:n	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1 <b>000</b> strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2200	39,5-41,5 (38,5-42,5)	2500 * RW 8,7-9,1	1800	39,0-41,0 (38,0-42,0)	100	min. 53,0	6,0
			1000	39,0-40,0	375		1,0
				(38,0-41,0)	2500	(5,5-9,0) 23,0-27,0 (22,0-28,0)	1.5 see (15) 2.5 point 8a 3,0 (16)

Checking values in brackets

C看 1 項 控制系列 rod travel than in Column 2

- 1. \*\* Set the idle auxiliary spring at  $n = 400 \text{ min}^{-1}$ so that the control-rod travel is exceeded by 0.1 - 0.2 mm.
- Setting the idle control-lever position: 2. At  $1090 \text{ min}^{-1}$ , control rod travel 1.9 - 2.0 mm
- Check the idle auxiliary spring shutoff 3. Control-lever position 47°. After change-over point up to 550 min<sup>-1</sup> no change in control-rod travel. Control-lever position 30°. Speed range 350 min<sup>-1</sup> - 450 min<sup>-1</sup>
- Check the pneumatic shutoff box 4.

Control lever at idle stop. At  $n = 375 \text{ min}^{-1}$  and pu = 450 mbar (vacuum)(338 mmHg) the control rod must return quickly to control-rod travel = 0 mm.

Testoil-ISO 4113

# Test Specifications Fuel Injection Pumps and Governors

40

WPP 001/4 MB 2,4 L 3. Edition

En

PES 4 M 55 C 320 RS 107

RSF 375/2250 M 18

Komb. Nr. 0 400 074 981 : Sales model

0 400 074 979

supersedes9.81

company Daimler Benz

engine OM 616

53 kW (72 PS)

1-3-4-2

0-90-180-270
All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at prestroke

2,20-2,30 (2,15-2,35)

mm (from BDC)

Control rod travel

20mm

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensionin (compensating valve	
rev/min	mm	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> /100 strokes	mm	cm <sup>3</sup> /100 strokes	mm .	
1	2	3	4	2	3	6	
1000	13,9+0,	3,9-4,0	0,25(0,30)				
375 1800 2200	6,5-6,7		0,1(0,15 0,25(0,3) 0,25(0,3)				

Set uniform delivery according to the values in

Checking values in brackets

# **B. Governor Settings**

Lower rated sp	eed		Upper rated spe	eed		Variations in co	ntrol rod trave	91
Degree of deflection of control	Control rod travel		009.000	Control rod travel	Rotational soeed		Rotational speed	Control rod travel
lever	шш		lever	mm	rev/min		rev/min	шш
1	2	3	4	5	6	7	8	9
9-13 ① ② ③ ④ ⑤	min.11, max.11, 6,5-6,7	0 300		1	2500	(12) (13) (14) (6)	11000	min.20,3 13,3-13,5 13,9-14,0

# C. Settings for Fuel Injection Pump with Governor Mounted

Full-load d	,	Full-load speed (8a) regulation	Variations delivery		Starting fo	uel delivery	Difference
	np 40°C (104°F)			(18)		3	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2200	39,5-41,5 (38,5-42,5)	2500* RW 8,7-9,1	1800 1000	39,0-41,0 (38,0-42,0) 39,0-40,0) (38,0-41,0)	100 375 2500	min. 53,0 6,0-7,0 (5,5-9,0) 23,0-27,0 (22,0-28,0)	1,0 1,5 2,5 see (5) 3,0 point 8a

Checking values in brackets

Ca. 4 mm less gentrol rod travel than in Column 2

- 1. \*\* Set the idle auxiliary spring at n = 400 min<sup>-1</sup> so that the control-rod travel is exceeded by 0.1 0.2 mm.
- 2. Setting the idle control-lever position:

  At 1000 min<sup>-1</sup>, control rod travel 1.9 2.0 mm
- 3. Check the idle auxiliary spring shutoff

Control-lever position 47°. After change-over point up to 550 min<sup>-1</sup> no change in control-rod travel. Control-lever position 30°. Speed range 350 min<sup>-1</sup> - 450 min<sup>-1</sup>

4. Check the pneumatic shutoff box

Control lever at idle stop. At  $n=375~\text{min}^{-1}$  and pu=450~mbar (vacuum) (338 mmHg) the control rod must return quickly to control-rod travel = 0 mm.

# **Test Specifications** Fuel Injection Pumps 1 wpp 001/4 PER 10,0 o and Governors

1. Edition

PES 8 MW 100/720 RS 1021 0 403 448 115

Testoil-ISO 4113

ROV 275-1125 MW 40

supersedes Perkins company: **V8.640 GR** 

148 kW (201 PS)

1 - 8 - 7 - 5 - 4 - 3 - 6 - 2 0 - 45 - 90 - 135 - 180 - 225 - 270 - 315 - 0,50 (0,75)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings 3,00 - 3,10 Port closing at prestroke (2,95 - 3,15)

mm (from BDC) PM = 9.0 - 12.0 mm

POR Closing at pro-		2.95 - 3.131		Sections	Fuel delivery	Spring pre-tensioning
Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod	rue centery	(torque-control valve)
rev/min	mm 2	cm³/100 strokes	cm <sup>3</sup> / 100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6
800	10,7+0,1	9,05 - 9,25	0,35(0,6)			
275	6,2-6,4	1,35 - 1,75	0,35(0,55	<b>)</b>		

Adjust the fuel delivery from each outlet according to the values in

# **B. Governor Settings**

Upper rated s	peed		Intermedial	e rated sp	eed	Lower rated	speed	1	Sliding s	leeve travel
deflection of control	rod travel	mm <	Degree of deflection of control lever	rev/min	Control rod travel mm 4	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 3 9	r <del>ev</del> /min 10	(1) mm 11
max.	1190 1350	15,2-17, 0 - 1,		-	-	ca. 11		6,2-6,4 min. 7,7		
ca. 62	9,7 4,0	1175-118 1220-125	<b>\$</b>			300-500				

Torque control travel a =

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-rod Test oil terr	stoo	Rotational-speed 2b limitation intermediate speed	Fuel deliv	ery characteristics (5a)	Starting Idle switching		Torque- travel	Control rod
rev/min	cfh³/1000 strokes .	rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	mm
1	2	3	4	5	6	7	8	9
800	90,5 - 92,5 (88,5 - 94,5)	ł			100	min. 140,0		
					100-	195 (80-215)		

Chacking values in brackets

\* 1 mm less control rad travel then col. 2

# Port closing and TDC markings:

Comb. - No. ... 115

Ocamshaft between port-closing and TDC at control-rod travel 9,0 - 12,0 mm 15°

C2

WPP 00 1/4 MB 3,0 m

2. Edition

PES 5 MW 55/320 RS 16 RW 375/2200 MW 28-1 0 403 245 013 0 403 245 014 - Sales model supersedes 2,80

company Daimler Benz

engine

OM 617 A

Caution: Read important information on back before beginning testing.

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at prestroke

2,10-2,20

mm (from BDC)

Control rod travel 21mm

Without Al DA

(2 05-2 25)

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (compensating valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> /100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
1000	13,5+0,	5,15 - 5,25	0,25(0,3)			
375	5,2-5,	3 0,6 - 0,7	0,10(0,15)	)		
1600			0,25(0,3)			
2180			0,25(0,3)			

Set uniform delivery according to the values in [

Checking values in brackets

#### **B.** Governor Settings

#### Without ALDA

Lower rated sp	eed		Upper rated spe	eed		Variations in control rod travel			
Degree of deflection of control	Control rod travel	Rotational speed	deflection of control	travel	Rotational speed	·	Rotational speed	Control rod travel	
lever	mm	rev/min	lever	mm	rev/min	İ	rev/min	mm	
1	2	3	4	5	6	7	8	9	
27-31 ① ② ③	min.11 max.11 5,2-5,3	100 320 375	69 (7) (8) (9)	12,1-12	2300-2320	(13)	•	20,5-21,5	
(4) (5)	-	-	00	4,0 0,0-1,0	2620-2720 2950		1000 Switching po 260-310	13,5-13,6 0(240-330)	

#### C. Settings for Fuel Injection Pump with Governor Mounted Without ALDA

Full-load d	elivery (19)	Full-load speed (8a)	Variations delivery	in fuel (17)	Starting for	uel delivery		
Test on ten	mp 40°C (104°F)			🔞		Manager 1	Difference	!
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	cm <sup>3</sup> /1000 strokes	!
1	2	3	4	5	6	7	8	
2180	50,0-52,0 (49,0-53,0)	2300-2320* (2290-2330)	1600	51,5-53,0 (50,5-54,5)	100	min. 55,0	6,0	23)
		(333)	1000	51,5-52,5 (50,5-53,5)	375	6,0 - 7,0 (5,5 - 9,5)	1,0	15)
					2550	24,0-30,0	2,5	
						(23,0-31,0)	(3,0)	16)

Checking values in brackets

<sup>\* 1</sup> mm less control rod travel than in Column 2

Testing	with ALDA			MB 3.0 n
Point	min <sup>-1</sup>	cm <sup>3</sup> /1000 H	RW	Pressure (absolute)
18	1000	51,5 - 52,5 (50,5 - 53,5)	13,5 - 13,6	1733 mbar(1300 mmHg)
18a	*** 1000	41,0 - 43,0 (40,0 - 44,0)	•	1067 mbar( 800 mmHg)
19	2180	50,0 - 52,0 (49,0 - 53,0)	12,1 - 12,3	1733 mbar (1300 mmHg)
12a	100	min. 55	20,5 - 21,5	1733 mbar (1300 mmHg)
15	375	6.0 - 7.0 (5.5 - 9.5)	5,2 - 5,3	987 mbar (740 mmHg)

#### 1. Adjusting the idle

Test supersedes Section 4.1 of test instructions VDT-W-420/300 Suppl. 2, Ed. 2.

Set the control lever to an angle of  $69^{\circ}$ . Operate the fuel-injection pump at 1000 min<sup>-1</sup>.

Screw in the spring retainer until a control-rod travel of 13,5 - 13,6 mm is reached.

Set the control lever to an angle of  $49^{\circ}$ . Operate the fuel-injection pump at 1000 min<sup>-1</sup>. Control-rod travel 8,8 - 9,5 must be reached.

# 2. Adjusting the lower rated speed

Text supersedes Section 4.3 of test instructions VDT-W 420/300 Suppl. 2, Ed. 2.

Operate the fuel-injection pump at  $n=800~\mathrm{min}^{-1}$ . Take back the control lever until a control-rod travel of 1.0 - 1.3 mm is reached.

The resulting deflection of the control lever must be within the allowable tolerance. Fix the control lever in this position. Drive the fuel-injection pump at a speed according to Point 2 Section B of the test specification sheet. Set regulation at adjusting screw (28).

# 3. Adjusting the idle-speed auxiliary spring (70)

Position the idle-speed auxiliary spring in contact as the characteristic curve levels off at  $n=520-550 \text{ min}^{-1}$ .

#### 4. Adjusting the sensing lever

Place the control lever against the full-load stop. Operate the fuel-injection pump at  $n=375\,\mathrm{min}^{-1}$ . Adjust the sensing lever so that the control-rod travel is 0.1 (0.1 - 0.2) mm above the full-load control-rod travel at  $n=1000^{-1}$ .

- 5. \*\*\* Correct the quantity of fuel injected at the correction screw of the ALDA aneroid box. Max. correction ± 0.75 mm control-rod travel.
- 6. Pin projection =  $16.65 \pm 0.1$  mm
- 7. Shutoff check: Operate the fuel-injection pump at n = 200 min<sup>-1</sup>. Force the control rod through the spring-loaded idle stop. The resulting control-rod travel must be max. 5 mm.
- 8. Test the pneumatic shutoff: Control lever in idle position.

  Operate the fuel-injection pump at n = 375 min<sup>-1</sup>. At 450 mbar

  (338 mmHg) (vacuum) the control rod must move briskly to control-rod travel 0 mm.
- 9. Control-lever range idle full load =  $38 42^{\circ}$ .

WPP 0C1/4 RYI 9,8 5 1

1. Edition

PE 6 P 120 A 321 RS 438

RQV 275-1200 PA 648

Values apply to engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1 680 750 067 supersedes company PVI engine: MID 062045

# Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at pres	troke	(3.45 - 3.65)	mm (from BDC)			
Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1200	11,2+0,	13,4-13,7	0,5(0,9)			
275	5,3-5,5	0,7-1,3	0,8(1,2)			
		i I				

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated s	peed			Intermediate	rated spe	eed	Lower rated	speed		Sliding sl	eeve travel
	rev/min Control	Control rod travel		Degree of deflection		Control rod	Degree of deflection		Control rod travel		0
of control lever	rod tr <b>ave</b> mm	mm rev/min	3	of control lever	rev/min	mm (4	of control lever	rev/min	пт 3	rev/min	mm
1	2	3		4	5	6	7	8	9	10	11
max.	1230	15,2-17,8	В	-	-	-	ca. 11		min.6,9	250 570	0-0,9
CE	10.2	1240-1250						275	1 5,3-5,5	880	4,7-5,0 6,1-6,3
ca. 65		1335-136	5				270-365			1200	8,3
							<b>③</b>				

Torque control travel a =

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ter	d stop	Rotational-speed (2b) limitation intermediate speed	Fuel delin high idle s	rery characteristics(5e) peed (5e)	Starting idle switching	0	Torque- travel	control 5  Control rod
rev/min	cm³/1000 strobes	rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min 8	travel mm
1200	134,0-137,0	1240-1250*	-	-	100	180,0-200,0		-
	(131,0-140,0)				275	7,0-13,0		
								-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

**C**6

**6** 

Testoil-ISO 4113

Test Specifications
Distributor-type
Fuel-injection Pumps

40

WPP 001/4 VWW 1,6v2 3. Edition

n

VE 4/9 F 1500 R 85-3

supersedes" 6.82

company:

VWW 50 Hz-Aggr.

0 460 494 108

Pre-stroke setting

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Fump Test Benches and Testers

Test Instructions and Test Equipment

mm

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings	•	Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1480	2,8-3,2	mm		
1 2 Supply pump pressure	1480	4,9-5,5	bar (kgf/cm²)	. 💛	
1.3 Full-load delivery without charge-air pressure	1480	32,5-33,5	cm <sup>3</sup> /1000 strokes		2,5 (3,0)
Full-load delivery with charge-air pressure			cm <sup>3</sup> /1000 strokes		
1.4 Idle speed regulation	425	6,0-10,0	cm <sup>3</sup> /1000 strokes		2,0 (3,0
1.5 Start	100 -	min. 38,0	cm <sup>3</sup> /1000 strokes		
1.6 Full-load speed regulation	1550	12,0-18,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery				,	

2.1 Timing device	n = rev/min	1,3-2,1(1,0	)-2.4)		C	1480 2,3-3,7)
2.2 Supply pump	n = rev/min bar (kgf/cm²)	600 2,8-3,4	-,.,			
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	600 55-138(40-1	153)		55-	1500 138(40-153)
2.3 Fuel deliveries			. *		3. Dimen	for assembly
Speed control lever	Rot. speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	and adjustment mm
End stop	1630	max. 2,0			к	3,2-3,4
	1550		(11,0-19,0)		KF	5,7-5,9
	1480		(30,7-35,3)	•	MS	1,2-1,4
	600	21,0-24,0	(19,5-25,5)		svs	max.2,5
					+ FH	1,8-2,4
switch-off	1500	0			άκ	18,4-20,4
elect.	400	0			χ̈́L	10,2-13,5
idle stop	600	max. 2,0			Observations	
	425		(4,0-12,0)		+ *opera	iting
End stop	400 500	min. 17,5 max. 23,0			strol	ke (KSB)

max. cut-in voltage

2.4 Solenoid

xxx min. 10,0 V

WHXWHEKXXX rated voltage 12V

4

Testoil-ISO 4113

# **Test Specifications** Distributor-type Fuel-injection Pumps

WPP 001/4 Ope 1,6 d 2. Edition

VE 4/9 F 2300 R 82 0 460 494 071

supersedes 6.82 company: Ope1 2033-1,6 L

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

min

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings	٠	Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	3,1-3,5	mm		
1 2 Supply pump pressure	1500	5,0-5,6	bar (kgf/cm²)		
1.3 Full-load delivery without charge-air pressure	1500	28,5-29,5	cm <sup>3</sup> /1000 strokes		2,5(3,0)
Full-load delivery with charge-air pressure	-	-	cm <sup>3</sup> /1000 strokes		
1.4 Idle speed regulation	450	6,0-10,0	cm <sup>3</sup> /1000 strokes		2,5(3,0)
1.5 Start	100	min. 42,0	cm <sup>3</sup> /1000 strokes		
1.6 Full-load speed regulation	2640	17,0-23,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery	1500	-			

2. Test Spe	cifications	checking values in b	rackets ( )			
2.1 Timing device	n = rev/min	1200 1,4-2,2(1,	1-2,5) (	1500 (2,6-4,0)		300 (6,5-7,9)
2.2 Supply pump	n = rev/min bar (kgf/cm²)	600 2,4-3,0				300 -7,9
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	500 55 <b>-1</b> 38 (40	-153)			300 40 <b>-1</b> 53)
2.3 Fuel delivenes					3. Dimer	for assembly
Speed control lever	Rot speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	and adjustment mm
End stop	3000 2800 2640 2300 2000 1500 600	1	(6,0-14,0) (16,0-24,0) (26,1-30,7) (25,7-30,3) (26,7-31,3) (21,7-27,7)		K KF MS SVS * FH XK B XL	3,2-3,4 5,7-5,9 1,2-1,4 max. 2,0 1,8-2,4 24,2-26,2 9,9-13,2
End stop	1200 650 450 400 500	0 2,0-7,0 min. 30 max. 28	(0,5-8,5) (4,0-12,0)		Observations * *opera strok	ting e (KSB)
2.4 Solenoid	max. cut-in voltag	<ul><li>xxx min.</li><li>rated voltage</li></ul>	10,0 V e 12V.			

40

WPP 001/4 KHD 1 g 1

2. Edition

En

PES3A85D410/3 RS 2642

RSV325-1150A8B2102-1L

1 - 3 - 2 je 120°  $\pm 0.5^{\circ}$  ( $\pm 0.75^{\circ}$ )

supersedes:

company:

npany: KHD

engine:

F3L 913

6.82

42 kW (57 PS)

2300 min 1

Tractor

ctor D 6007-S23

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at prestroke

(2.45 - 2.65)

mm (from BDC

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
700	11,8+0	1 6,6-6,7	0,3 (0,4	5)		
325	8,9-9	1 1,7-2,3	0,2 (0,4	)		
	İ					
		1		i		

Adjust the fuel delivery from each outlet according to the values in

# **B.** Governor Settings

Upper	rated speed		Intermediate	rated spe	ed	4 Lowe	r rated spe		3 Tor	que control
Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	Control rod travel mm
,1	2	3	4	5	6	7	8	9	10	11
loose	800	0,3-1,0	-	-	-	ca.20	325	8,5	1150	11,5+0,
r n diden	χ=						100 325	min.19,0 8,9-0,1 545=2,0		11,8+0, 11,6+0,
<b>⑤</b> ca.5	4 10,2 4,0 1350	1190-1200 1265-1295 0.3 -1.7					400-	545=2,0		

<sup>\*\*</sup> Set speed regulation before torque control.

The numbers denote the sequence of the tests

# C. Settings for Fuel Injection Pump with Fitted Governor

2 Full-los	ad stop	Rotational-speed limitat. 3a Fuel delivery characteristics			Starting Idle	fuel delivery	(5a) idle stop		
Test oil temp. 40°C (104°F) rev/min cm³/1000 strokes 1 2		Note: changed to rev/min 3	rev/min cm³/1000 strokes 4 5		rev/min cm³/1000 strokes 6 7		rev/min 8	Control rod travel mm	
700	66,0-67,0 (64,0-69,0)	1190-1200	1150	70,5-73,5 (68,5-75,5)	100	133,5-143,	5 -	-	

Checking values in brackets

\* 1 mm less control rod travel than col. 2

WPP 001/4 PEN 12,0 d

1. Edition

En

PE 6 P 120 A 320 RS 3088 Z

RSV 200-900 P4/421 R

supersed∈s

Volvo-Penta company.

TMD 120 B

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at prestroke

**Testoil-ISO 4113** 

(2,55-2,75) mm (from BDC)

Rotational speed rev/min	Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
700	11,7+0,1	19,4-19,8	0,5 (0,9)			
250	3,6-3,8	1,6-2,0	0,5 (0,8)	`		

Adjust the fuel delivery from each outlet according to the values in

# **B.** Governor Settings

14 0 0	r rated speed Control rod travel mm		Intermed	hate rated	speed	Control- tever deflection in degrees 7	Lower rev/min 8	rated speed Control rod travel mm	(	rque control Control rod travel mm
loose	800 X =	0,3-1,7 4,0	-	-	~	ca.22	250 100 250	3,2 min.20,0 3,6-3,8	-	-
ca.53	10,7 4,0 1130	940- 950 970-1000 0,3-1,7					300-3			

The numbers denote the sequence of the tests

# C. Settings for Fuel Injection Pump with Fitted Governor

	ili-load stop emp. 40°C (104°F)	Rotational- speed limitat. Note: changed to)	-14	el delivery aractenstics	Starting f	uet delivery 5	da Idle stop  Control rod  travel		
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes		mm	
1	2	3	4	5	6	7	8	9	
700	194,0-198,0 (192,0-200,0)	940-950*	900	218,0-222,0 (215,0-225,0)	100	390-440 = 20,0- 21,0 mmRW	250	3,7	

Checking values in brackets

\* 1 mm less control rod travel than col 2

12.82

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WPP 001/4 KHD 19,0 k

2. Edition

PE 12A 95D 610LS 2453 ROV 300-1150 AB 1083 L " supersedes 82 company: KHD

engine: F 12 L 413 F 260 kW(352PS) \_1 1 - 4 - 9 - 8 - 5 - 2 - 11 - 10 - 3 - 6 - 7 - 12 260 kW(352PS) 0 -15 -60 -75 -120-135-180 -195 -240-255-300-315°±0,5° (±0,75°) bei 2300 min

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings (1,95-2,15) Port closing at crestroke 2,00-2,10

mm (from BDC)

Rotational speed	Control rod	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> / 100 strokes	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1150	9,5-9,6	8,8-9,0	0,3(0,6)			
300	6,4-6,6	1,6-2,2	0,3(0,5)			
	ŀ					

Adjust the fuel delivery from each outlet according to the values in [

# **B.** Governor Settings

# Testoil-ISO 4113

Upper rated s	peed			Intermediate	rated spe			Lower rated		Sliding sleeve travel		
Degree of deflection of control lever	Control rod travel	Control rod travel mm rev/min		of control	rev/min 5	Control ro travel mm 6	<b>d</b> <b>⊙</b>	Degree of deflection of control lever	rev/min 8	Control rod travel mm (3	rev/min 10	mm 11
max.	1150	15,2-	17,8	-	<b>.</b>	-	_			min.8,0 6,4-6,6 00=2,0		1,4-1,6 4,0-4,3 8,5
ca.66	8,5 4,0 1400	1190-12 1240-12 0 -	270					320-400 3				

Torque control travel a =

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of Control-ro Test oil te		Rotational-speed (20) imitation intermediate speed	Fuel deliv high idle s	ery characteristics(5a) peed (5b)	Starting Idle switching		travel	control (5) Control rod travel
rev/min	_	rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	
1150	87,5 - 89,5 (85,5 - 91,5)	1190-1200*	1000 700	87,0-90,0 (85,0-92,0) 88,0-91,0 (85,0-92,0)	100	120 - 130 bei 14,3 - 14,7 mm RW	945 800 700	9,5-9,6 9,5-9,8 9,8-10,0 9,9-10,0 9.9-10,0
					100-2	220 (80-240)	400	5.3-140

Checking values in brackets

1 mm less control rod travel than col. 2

WPP 001/4 KHD 6,1 i

3. Edition

PES 6 A 85 D 410/3 RS 2415

Testoil-ISO 4113

RQV 300-1250 AB 1131 L

supersedes 9.82 company: KHD

engine: BF 6 L 913 T 96 kW bei 2500 min 1

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at pres	troke	(1.85-2.05)	mm (from BUC)			
Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm 2	cm <sup>3</sup> /100 strokes 3	cm <sup>3</sup> / 100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6
1250	12,0+0,	7,8-7,9	0,3(0,45)			
300	8,4-8,	0,9-1,5	0,2(0,4)			

Adjust the fuel delivery from each outlet according to the values in

# **B.** Governor Settings

deflection of control	rev/min Control rod travel	Control rod travel mm rev/min	<b>(1)</b>	Intermediate Degree of deflection of control lever		Control rod travel	•	Lower re Degree deflection of contributer 7	of on rol	rev/min	Control retravel	od	Sliding si rev/min 10	mm
max.	1385	15,2-17,	,8	-	-	-		ca. 1	17		min.10 8,4-8		250 580	0,9-1,1 3,9-4,1
ca. 65	11,0 4,0 1525	1290-130 1415-144 0-1,0						450-5 ③	5 <b>50</b>	645-	705=2	,0	920 1250	5,4-5,6 7,8

Torque control travel a =0.9

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ter	d stoo	Rotational-speed (20) limitation intermediate speed	Fuel deliv high idle s	ery characteristics (56) peed (50)	Starting Idle awitchin		travel	Control rod
'rev/min	cm³/1000 strokes	rev/min 49	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm³/1000 strokes 7	rev/min 8	mm 9
1250	78,0 - 79,0 (76,0 - 81,0)		8 00	69,5-71,5 67,5-73,5)	i	105,0-115,0 bei 17,4-17, mm RW	R 600	12,0+0, 12,8+0, 12,3+0,

Checking values in brackets

1 mm less control rod travel than col. 2

WPP 001/4 SSC 38,1 a 1. Edition

PE 12 P 110 A 520/6 LS 3090-1

ROV 300-750 PA 614

companySSCM

1-8-5-10-3-7-6-11-2-9-4-12 engine: POYAUD V 12-150 0 -37,5-60-97,5-120-157,5-180-217,5-240-277,5-300-337,5°  $\stackrel{\cdot}{=}$  0,5° ( $\stackrel{\cdot}{=}$  0,75°)

530 kW (720 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at prestroke mm (from BDC) RW 9.0-12.0 mm Rotational speed Control rod Spring pre-tensioning (torque-control valve) **Fuel delivery** Control rod Fuel delivery cm3/ rev/min cm<sup>3</sup>/100 strokes 100 strokes cm<sup>3</sup>/100 strokes 750 0,4 (0,8 13,3+0,1 24,6-24,9 300 4.7-4.9 1,8-2,4 0,4 (0,7

Adjust the fuel delivery from each outlet according to the values in [

# **B. Governor Settings**

	rev/min Control	Control rod (a)	Degree of   Control rod			Lower rated Degree of deflection	speed	Sliding sleeve travel		
of control lever 1	rod trave	mm rev/min 2a 3	of control lever 4	rev/min 5	mm (4)	of control lever 7	rev/min 8	mm 3	rev/min 10	mm 11
max.	780	15,2-17,8	-	-	-	са.10		min.6,3	250	0,2-0,6
ca.66	12,3 4,0 1000	790-800 835-865 0-1,0						4,7-4,9  85=2,0	420 580 750	3,4-3,7 5,2-5,4 8,0
						<b>3</b>				

Torque control travel s =

# C. Settings for Fuel Injection Pump with Fitted Governor

Fuil-load de Control-red Test oil ten		Rotational-speed 20 limitation intermediate speed	Fuel delivinghide s		Starting idle switching		Torque- travel	control (5) Control rod	
rev/min	cm³/1000 strokes .	rev/min 40	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	travel mm	
1	2	3	4	5	6	7	8	9	
750	246,0-249,0 (243,0-252,0				100	19,5-21,0 mmRW	ł	•	

Checking values in brackets

\* 1 mm less control rod travel than col. 2

12.82

Testoil-ISO 4113

WPP 001/4 SSC 19,0 a
1. Edition

PES 6 P 130 A 520 LS 3091

ROV 300-750 PA 614

supersedes

companySSC M engine: Poyaud - L 685 368 kW (500 PS)

Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at pres	troke	(2,75-2,95)	-2,95) mm (from BDC)= RW 9,0 - 12,0 mm							
Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)				
rev/min	mm	cm <sup>3</sup> /100 strokes	100 strokes	mm	cm <sup>3</sup> /100 strokes	mm				
1	2	3	4	2	3	6				
750	14,7+0,1	44,5-44,9	0,4 (0,8)							
300	5,5-5,7	2,2-2,8	0,4 (1,2)							
	I									

Adjust the fuel delivery from each outlet according to the values in

# **B. Governor Settings**

Upper rated	speed		Intermediate	e rated sp	eed	Lower rated	speed		Sliding s	leeve travel
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min 2	of control	rev/min 5	Control rod travel mm 4	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 3 9	rev/min	1
max.	780	15,2-17,8	-	-	-	ca. 11	100 300	min.7,1 5,2-5,4	250 420	0,3-0,6 3,3-3,7
ca.66	13,7 4,0 1000	790-800 850-880 0-1,0				325-435			No.	5,1-5,4 8,0
						<b>③</b>				

Torque control travel a =

mm

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load di Control-roi Test oil ten	np. 40°C (104°F) 2	Rotational-speed (20) limitation intermediate speed rev/min (4a)	Fuel deliv high idle s	peed (50) cm³/1000 strokes	switchin	_	Torque- travel	Control rod travel
1	2	3	4	5			8	9
750	445,0-449,0 (442,0-452,0)		•	-	100	19,5-21,0 mm RW	•	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

**Test Specifications** Distributor-type Fuel-injection Pumps

WPP 001/4 VWW 2,4 a

1. Edition

VE 6/10 F 2400 L 116-1 0 460 406 019

supersedes company.VWW engine: 087- T

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

mm

2. Test Specifications checking values in brackets (

see VDT-W-460/...

1. Settings	Rot speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	1,4-1,8	mm	0,75	
1.2 Supply pump pressure	1500	5,7-6,3	bar (kgf/cm²)	0,75	
1.3 Full-load delivery without	600	26,5-27,5	cm <sup>3</sup> /1000 strokes	0 .	
charge-air pressure Full-load delivery with	1500	44,0-45,0	cm³/1000 strokes	0,75	3,0
charge-air pressure 1.4 Idle speed regulation	375	6,0-10,0	cm <sup>3</sup> /1000 strokes	0	3,0
1.5 Start	<i>=</i> 100	min.42,0	cm³/1000 strokes	0	
1.6 Full-load speed regulation	2600	10,0-16,0	cm <sup>3</sup> /1000 strokes	0,75	
1.7 Load-dependent start of delivery					

2.1 Timing device LDA=0.75 bar	n = rev/min mm	1200	150(	) 2,3) 4,1-4	2400 9(3.8-5.2)	
2.2 Supply pump  LDA=0,75 bar	n = rev/min ber (kgt/cm²)	600			2400 8,1-8,7	
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	600 55-138(40	-153)	55-	2400 138(40-153)	
2.3 Fuel delivaries					3. Dimen	for assembly and adjustment
Speed control lever	Rot. speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	mm
End stop	2750 2600 2400 1500 * 800 600	max. 4,0 35,5-37,5 33,5-34,5	(9,0-17,0) (34,2-38,8) (42,2-46,8) (31,0-37,0) (24,0-30,0)	0,75 0,75	K KF MS SVS	3,2-3,4 6,3-6,6 1,7-1,9 2,4
switch-off mech. elektr.	2400 400	0			ak Kl	21,8-23,8
End stop	375 600 400 500	max. 3,0 min. 20 max. 30	(4,0-12,0)		compensat = 4,2 mm. Correction	
2.4 Solenoid	max. cut-in volta	ege xxx min	10 V			

HEXTERNOLXXX rated voltage 12V.

Test Specifications
Distributor-type
Fuel-injection Pumps

WPP 001/4 VWW 2,4 b

1. Edition

П

VE 6/10 F 2400 L 116-2 0 460 406 020 supersedes company: VWW engine: 087 T

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

**Test Instructions and Test Equipment** 

Pre-stroke setting

6

Testoil-ISO 4113

mm

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	1,5 - 1,9	mm	0,75	
1.2 Supply pump pressure	1500	5,7 - 6,3	bar (kgf/cm²)	0,75	
1.3 Full-load delivery without	600	25,5 -26,5	cm <sup>3</sup> /1000 strokes	C	
charge-air pressure Full-load delivery with	1500	44,0 -45,0	cm <sup>3</sup> /1000 strokes	0,75	3,0
charge-air pressure  1.4 Idle speed regulation	375	6,0 -10,0	cm³/1000 strokes	0	3,0
1.5 Start	100	min. 42,0	cm <sup>3</sup> /1000 strokes	0	
1.6 Full-load speed regulation	2600	10,0 -16,0	cm <sup>3</sup> /1000 strokes	0,75	
1.7 Load-dependent start of delivery					

2. Test Spec	ifications	checking values in brackets (	)	
2.1 Timing device LDA = 0,75bar	n = rev/min	1200 0,2-1,0(0-1,3)	1500 (1,0-2,4)	2400 5,4-6,2(5,1-6,5)
2.2 Supply pump LDA = 0,75bar	n = rev/min bar (kgf/cm²)	600 3,3-3,9		2400 8,1-8,7
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	600 55-138(40-153	)	2400 55-138(40-153)
	<u> </u>			3. Dimensions

Speed control lever	Rot. speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)
End stop	2750 2600 2400 1500 * 800 600		(9,0-17,0) (33,7-38,3) (42,2-46,8) (30,0-36,0) (23,0-29,0)	0,75 0,75 0,75 0,75 0,30 0
switch-off elect.	400	0	and the second s	
idle stop	375 600	max. 3,0	(4,0-12,0)	
End stop	400 500	min. 20,0 max. 30,0		
2.4 Solenoid	mex. cut-in vo	mage xxx min. x rated voltage	10 V ge 12V.	

1SIONS for assembly and adjustment mm
3,2-3,4
6,3-6,6
1,7-1,9
2,4
21,8-23,8
9,4-12,7

#### Observation

Manifold-presssure compensator stroke = 4,2 mm.
Correction at the adjusting nut (46)

**BOSCH** 

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Testoil-ISO 4113

# Test Specifications Distributor-type Fuel-injection Pumps

40

WPP 001/4 VWW 2,4 a

1. Edition

n

VE 6/10 F 2400 L 116

0 460 406 018

supersedes company.VWW engine: 087- T

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

mm

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	1,4 - 1,8	mm	0,75	
1.2 Supply pump pressure	1500	5,7 - 6,3	bar (kgf/cm²)	0,75	
1.3 Full-load delivery without charge-air pressure	600	26,5 -27,5	cm³/1000 strokes	0	
Full-load delivery with charge-air pressure	1500	44,0 -45,0	cm <sup>3</sup> /1000 strokes	0,75	3,0
1.4 Idle speed regulation	375	6,0 -10,0	cm <sup>3</sup> /1000 strokes	0	3,0
1.5 Start	· 100	min. 42,0	cm <sup>3</sup> /1000 strokes	0	
1.6 Full-load speed regulation	2600	10,0 -16,0	cm <sup>3</sup> /1000 strokes	0,75	
1.7 Load-dependent start of delivery		.			

2. Test Spec	ifications	checking values in bra	ckets ( }			
2.1 Timing device LDA=0,75bar	n = rev/min mm	1200 0,2-1,0(0-1	,3) (0,9-		2400 1,9(3,8-5,2	)
22Supply pump LDA=0,75bar	n = rev/min bar (kgt/cm²)	600 3,3-3,9			2400 8,1-8,7	
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	600 55-138(40	-153)	5	2400 5-138(40-15	3)
2.3 Fuel deliveries	<u></u>				3. Dimen	for assembly
Speed control lever	Rot. speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	and adjustment mm
End stop	2750 2600 2400 1500 * 800 600	max. 4,0 35,5-37,5 33,5-34,5	(9,0-17,0) (34,2-38,8) (42,2-46,8) (31,0-37,0) (24,0-30,0)	0,75	K KF MS SVS	3,2-3,4 6,3-6,6 1,7-1,9 2,4
switch-off électr.	400	0			₹K ₹L	21,8-23,8
End stop	375 600 400 500	max. 3,0 min. 20,0 max. 30,0	(4,0-12,0)		Observations  Manifold- compensat = 4,2 mm. Correction	presssure tor stroke on at the
2.4 Solenoid	max. cut-in voltag	<ul><li>xxx min.</li><li>rated voltage</li></ul>			adjusting	; nut (46)

Testoil-ISO 4113

Test Specifications
Distributor-type
Fuel-injection Pumps

46

WPP 001/4 VMA 2,2a

n

3. Edition

supersed&0.02 company: VM-Motori

engine: HR 492 HT Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

VE 4/10 F 2100 L 75

0 460 404 024

mm

see VDT-W-460/...

1. Settings	Rot speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1600	6,3-6,7	mm	0,7	
1 2 Supply pump pressure	1600	5,8- 6,4	bar (kgf/cm²)	0,7	
1.3 Full-load delivery without	1600	31,5-34,5	cm <sup>3</sup> /1000 strokes	0	
charge-air pressure Full-load delivery with	1600	47,5-48,5	cm <sup>3</sup> /1000 strokes	0,7	2,5 (3,0
charge-air pressure 1.4 Idle speed regulation	400	15,0-19,0	cm <sup>3</sup> /1000 strokes	0	2,5 (3,0)
1.5 Start	100	min. 65,0	cm³/1000 strokes	0	
1.6 Full-load speed regulation	2300	24,5-30,5	cm <sup>3</sup> /1000 strokes	0,7	
1.7 Load-dependent start of delivery	-	-			

um u = ten/wiu	1000 1,9-2,7(1,6-3,0) (	1600 5,8-7,2)	2100 9,3-9,9(8,9	9-10,3)
n = rev/min bar (kgf/cm²)	400 1,5-2,1		2100 7,5-8	,1
n = rev/min cm <sup>3</sup> /10 s	500 55-138(40-153)		2100 55-138(4	Ü-153)
			3. Dimen	SIONS for assembly and adjustment
Rot. speed	Fuel delivery cm <sup>3</sup> /1000 strokes	Charge-air press. bar (kgf/cm²)	Designation	mm
2450 2300 2100 1600 * 700 600	41,5-44,5(40,7-45,3 (30,7-35,3 (45,7-50,3 43,0-46,0(41,5-47,5	0,7 0 0,7 0,7 0,3	K KF MS SVS * FH	3,2- 3,4 5,7- 5,9 1,4- 1,6 4,4- 4,6 1,8- 2,4
550-750 400	0 (13.0-21.)	a	Observations	10,0-13,3
350 500	min. 37,0 max. 37,0		compensat = 4,2 mm. Correction	or stroke
	mm  n = rev/min bar (kgf/cm²)  n = rev/min cm³/10 s  Rot. speed rev/min 2450 2300 2100 1600 1600 * 700 600  2100 350	mm 1,9-2,7(1,6-3,0) (  n = rev/min	n= rev/min	Rot. speed rev/min   Fuel delivery cm <sup>3</sup> /1000 strokes   Charge-air press bar (kgt/cm <sup>2</sup> )   7,5-8     Rot. speed rev/min   Fuel delivery cm <sup>3</sup> /1000 strokes   Charge-air press bar (kgt/cm <sup>2</sup> )   7,5-8     Rot. speed rev/min   Fuel delivery cm <sup>3</sup> /1000 strokes   Charge-air press bar (kgt/cm <sup>2</sup> )   7,5-8     Rot. speed rev/min   Fuel delivery cm <sup>3</sup> /1000 strokes   Charge-air press bar (kgt/cm <sup>2</sup> )   7,5-8     Rot. speed rev/min   Fuel delivery cm <sup>3</sup> /1000 strokes   Charge-air press bar (kgt/cm <sup>2</sup> )   7,5-8     2450

Test Specifications Distributor-type Fuel-injection Pumps

WPP 001/4 PEU 2,3e

2. Edition

supersedes 6.82 company: Peugeot XD 2 S - US

VE 4/10 F 2075 R 67

0 460 404 012

Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

mm

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	5,0-5,4	mm	0,8	
1.2 Supply pump pressure	1500	5,4-6,0	bar (kgf/cm²)	0,8	
1.3 Full-load delivery without	600	36,0-39,0	cm <sup>3</sup> /1000 strokes	0	2,5(3,0)
charge-air pressure Full-load delivery with	1125	48,7-49,7	cm <sup>3</sup> /1000 strokes	0,8	
charge-air pressure  1.4 Idle speed regulation	390	8,0-12,0	cm <sup>3</sup> /1000 strokes	0	2,5(3,0)
1.5 Start	100	min. 53,0	cm³/1000 strokes	0	
1.6 Full-load speed regulation	2400	9,5-15,5	cm <sup>3</sup> /1000 strokes	0,8	
1.7 Load-dependent start of delivery					

2. Test Spec	ifications	checking values in brackets (	)		
	ww u = ten/win	600 1,3-2,1(1,0-2,4)2,9-3	1000 3,5(2,5-3,9)(4	150 <b>0</b> ,5-5,9)6,9-7	2000 ,7(6,6-8,0)
2.2 Supply pump	n = rev/min bar (kgf/cm²)	400 1.6-2.2			2075 7,6-8,2
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	500 55-110(40-125)		55-110	2075 0(40-125)

2.3 Fuel delivenes					3. Dimer	for assembly
Speed control lever	Rot speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	and adjustment
End stop	2450 2400	max. 9,0	(7,5-16,5)	0,8 0,8	к	3,2-3,4
	2300	25,5-31,5	(24,5-32,5)	0,8	KF	5,7-5,9
	2000 1400	44.3-46.7	(43,2-47,8) (49,5-54,1)	0,8 0,8	MS	0,9-1,1
	1125 + 750		(46,9-51,5) (39,8-45,8)	0,8 0,25	svs	max.1,4
	600		(34,5-40,5)	Ó		
switch-off	2075	0			άκ	20,2-22,2
					<b>K</b> L	8,8-12,2
idle stop	450-550 390	0	(6,0-14,0)		Observations Manifold	-pressure
End stop	400 500				compensate =4,5 mm Correction	on at the
2.4 Solenoid	max. cut-in voltag	xxx min.	10.0 V		adjusting	g nut (46)

**BOSCH** 

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WPP 001/4 VWW 2,3 b

3. Edition

En

VE 6/10 F 2400 L 32-1 (P) 0 460 406 009; 010

Testoil-ISO 4113

supersedes • 8

engine: 087/10 Autom.

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

stroke setting mm see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	2,8 - 3,2	mm		
1.2 Supply pump pressure	1500	5, 2 - 5,8	bar (kgf/cm²)		
1.3 Full-load delivery without charge-air pressure	1500	28,5 - 29,5	cm <sup>3</sup> /1000 strokes		2,5(3,0)
Full-load delivery with charge-air pressure	-	-	cm <sup>3</sup> /1000 strokes		6 540 0
1.4 Idle speed regulation	350	10,0 - 14,0	cm <sup>3</sup> /1000 strokes		2,5(3,0)
1.5 Start	100	min. 42,0	cm <sup>3</sup> /1000 strokes		
1.6 Full-load speed regulation	2600	15,0 - 22,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery	-	-			

2. Test Spec		checking values in bracket		1500		2400	
2.1 Timing device	ww u = ten/win	0,8-1,6(0,5-1	,9) (2		6,0-6,8	3(5,7-7,1)	
2.2 Supply pump	n = rev/min bar (kgf/cm²)	600 2,8-3,4			2400 7 <b>,</b> 7-8 <b>,</b> 3		
Overflow delivery	n = rey/min cm <sup>3</sup> /10 s	500 55-138(40-15	3)		2400 55-138(40-153)		
2.3 Fuel deliveries	<u> </u>				3. Dimen	for assembly and adjustment	
Speed control lever	Rot. speed	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	mm	
End stop	2700 2600	6,0-12,0 (14, 22,0-24,0 (20, (26, 26,0-29,0 (24,	5-22,5)		К	3,2-3,4	
	2400 1500	22,0-24,0 (20,	7-25,3) 7-31,3)		KF	6,4-6,6	
	750	26,0-29,0 (24,	5-30,5)		MS	1,4-1,6	
					svs	max.3,0	
switch-off	2400	0			ж	18,5-20,5	
					和	9,2-12,9	
Idle stop	400 350	3,0-9,0	)-16,0)		Observations  Stop check (lever) at n = 2400 min-1		
End stop	400 500	min. 20 max. 25			at n = 2	:400 III.III-1	
2.4 Solenoid	max. cut-in volta	xxx min. 10, rated voltage 1	0 V 2 <b>V</b> .				

ceo

WPP 001/4 RVI 9,8 b

1. Edition

En

PE 6 P 120 A 321 RS 438

RQV 275-1200 PA 538

supersedes\_

company: RVI

engine: MID 062045

152 kW (206 PS)

**Festoil-ISO 4113** 

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at pres	troke (3	3.45-3.65)	mm (from BDC)			
Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm.	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> /	mm	cm <sup>3</sup> /100 strokes	mm

1	2	3	4	2	3	6
1200	0,6+0,1	14,7-15,1	0,5(0,9)			
275	5,3-5,5	0,7-1,3	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in \_\_\_\_\_\_\_.

# **B. Governor Settings**

Upper rated s	speed			Intermediate rated speed			Lower rated	speed	Sliding s	Sliding sleeve travel	
deffection	Control	Control rod travel	<b>①</b>	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel	1	
of Control lever	rod travel	rev/min	(28)	of control	rev/min	mm (4)	of control lever	rev/min	mm (3)	rev/min	mm
1	2	3		4	5	6	7	8	9	10	11
max.	1200	15,2-17	,8	-	-	-	ca. 10	100 275	min.6,9 5,3-5,5	250 570	0,4-0,7 3,7-3,9
ca. 64	9,6 4,0	1240-12 1310-13								880 200	5,3-5,5 8,0
	1450	0-1,	0	ļ	Ŀ		280-390				
						ŀ	<b>3</b>				

Torque control travel a =

mm

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc Test oil terr		Rotational-speed 20 firmitation intermediate speed	high ide speed		Starting idle switchir		Torque- travel	Control rod	
rev/min	cfh³/1000 strokes .	rev/min 40	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	mm	
1	2	3	4	5	6	7	8	9	
1200	147,0-151,0 (144,0-154,0)		-	-	100	180,0-200,0	-	-	
	-				275	7,0-13,0			

Chucking values in brackets

\*1 mm less control rod travel than col. 2

# Testoil-ISO 4113

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 MB 9,5 a 3 1. Edition

PES 5 P 110 A 820 LS 434 ROV 300-1100 PA 594-1

1 - 3 - 5 - 4 - 2 je 72 °  $^{+}$  0,5 ° ( $^{+}$  0,75 °)

supersedes

companyDaimler Benz engine OM 409 135 kW (184 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

mm (from BDC)

Rotational speed rev/min	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	10,4+0,1	11,0-11,2	0,4(0,8)			
300	7,6-7,8	1,2-1,8	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in [

# **B.** Governor Settings

Upper rated s	speed		Intermediate	rated sp	eed	Lower rated	speed		Sliding	leeve travel
deflection	rev/min Control	Control rod travel	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel	Silding s	1
1.	rod travel mm	rev/min 2s	of control lever	rev/min	mm (4)	of control lever	rev/min	mm (3)	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
max.	1150	15,2-17,8	-	-	-	ca.34	100 300	min. 8,5	250 530	1,0-1,3
62.64	0.4	1140-1150				İ	300	1 /,0-/,2	820	3,9-4,2 5,5-5,8
ca.64	9,4 4,0 1300	1175-1205 0 - 1,0				320-43	•		1100	8,2
						<b>3</b> a				

Torque control travel a =

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-red Test oil ten		Rotational-speed 2b limitation intermediate speed	Fuel delivingh idle s	rery characteristics (5a peed (5b)	Idle	fuel delivery 6	Torque- travel	control 5
rev/min	cm³/1000 strokes	rev/min 49	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	travel mm
1100	110,0-112,0 (107,0-115,0		600	93,0-97,0 (90,0-100,0		130,0-150,0	•	

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

 $\odot$ 

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 MB 11,41

2. Edition

\_\_\_\_

PES 6 P 110 A 820 LS 442

ROV 300-1100 PA 594-2

supersed8.81 companyDaimler-Benz engine: 0M 407 h

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

3.2 - 3.3

# A. Fuel Injection Pump Settings

Rotational speed rev/min	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	11,3+0,1	12,5 - 12,7	0,4(0,8)			
300	7,7-7,9	1,3 - 1,9	0,4(0,7)			
	l t					

Adjust the fuel delivery from each outlet according to the values in

# **B.** Governor Settings

deflection of control	peed rev/min Control rod travel rom	travel	Intermediate Degree of deflection of control lever	rated spo	control rod travel	Lower rated Degree of deflection of control lever	speed rev/min	Control rod travel	Sliding sleeve travel  1 rev/min mm	
1	2	3	4	5	6	7	8	9	10	11
max.	1100	15,2-17,8	-	-	-	ca. 40	100 300	min. 9,4 7,7-7,9		1,0-1,3 4,0-4,3
ca. 62	10,3 4,0 1300	1140-1150 1175-1205 0 - 1				320 <b>-</b> 450				5,3-5,7 8,1

Torque control travel a =

mm

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roe Test oil ten		Rotational-speed (2b) limitation intermediate speed	Fuel delivingh idle s	ery characteristics (5e) peed (39)	Starting Idle switching		Torque- travel	Control (5)	
rev/min cft <sup>3</sup> /1000 strokes .		rev/min 49	rev/min	cm <sup>3</sup> /1000 strokes	nev/min cm³/1000 strokes		rev/min	travel mm	
1	2	3	4	5	6	7		9	
1100	125,0-127,0 (122,0-130,0)	* * * * * * *	600	108, 0- 112, 0 (105, 0- 115, 0)		130,0-150,0		•	

Checking values in brackets

\* 1 mm less control rod travel then col. 2

WPP 001/4 MB 11,4 L3

2. Edition

En

PES 6 P 110 A 820 LS 442

Testoil-ISO 4113

ROV 300-1100 PA 594-3

supersedes 2.82 company: Daimler-Benz

engine: OM 407

162 kW (220 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

mm (from BDC) Zyl. 6 Port closing at prestroke (3.15-3.35)Spring pre-tensioning (torque-control valve) **Fuel delivery** Control rod Difference Control rod **Fuel delivery** Rotational speed cm<sup>3</sup>/ cm<sup>3</sup>/100 strokes mm cm<sup>3</sup>/100 strokes 100 strokes rev/min mm 0.4(0.8)11,6 - 11,8 11,0+0, 1100 1.4 - 2.00.4(0.7)300

Adjust the fuel delivery from each outlet according to the values in

# **B.** Governor Settings

deflection of control	rev/min Control rod travel	Control rod travel mm rev/min	<b>(</b>	Intermediate Degree of deflection of control lever	rev/min	Control rod travel	Lower rated Degree of deflection of control lever 7	rev/min 8	Control rootravel mm	, ③	Sliding si rev/min 10	mm
max.	1100	15,2-17	,8	-	•	-	ca.32	100 300	min. 7,3-7		250 530	1,0-1,3 3,9-4,2
ca. 60	10,0 4,0 1300	1140-11 1175-12 0 - 1	05				320-450				820 1100	5,5-5,8 8,1
							<b>3a</b>					

Torque control travel a =

mп

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc Test oil ten	1 stoo	Rotational-speed 20 limitation stermediate speed	Fuel delivingh die s	ery characteristics (5a) peed (50)	Starting didle switching	. 0	Torque- travel	Control cod	
		rev/min 49	rev/min	cm <sup>3</sup> /1000 strokes	rev/min 6	cm-V1000 strokes	rev/min 8	mm 9	
1100	116,0-118,0 (113,0-121,0)	1140-1150*	600	103, 0- 107, 0 (100, 0- 110, 0)		130,0-150,0	•	-	

Checking values in brackets

\* 1 mm less control rod travel than col. 2

1.83

BOSCH

# **Test Specifications** Fuel Injection Pumps (1A) and Governors

WPP 001/4 HAN 7,2 b

1. Edition

PE 4 A 95 D 420 RS 2662

RSV 350-1100 A 8 B 1120 DR

supersedes-

company Hanomag engine D 943 A 1

Use overflow valve 1 417 411 000 \*\* Test cold-start device according to VDT-DAF-004, page 2

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

2,15-2,25

mm (from BDC)

(2.10-2.30)Port closing at prestroke

Rotational speed rev/min	Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery cm-/100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	11,3+0,1	11,0-11,2	0,3(0,6)			
350	6,4-6,6	1,1-1,7	0,3(0,5)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Testoil-ISO 4113

Degree of deflection of control lever	Control rod travel mm		Interme	diate rate	d speed	Control- lever deflection in degrees 7		rated speed Control rod t avel mm	3 To	rque control  Control rod travel mm
loose	800 x =	0,3-1,0 3,75	•	•	•	ca.19	350 100	6,0 min.19,5	i	11,3-11,4
ca.49	10,3	1140-115 1195-122					350 <b>490-</b> 550	6,4-6,6 = 2,0	980	11,4-11,6

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

	lit-load stop	6 Rotational- speed limitat		el deirvery aractenstics	Starting f	uel delivery 5	49	stop Control rod
rev/min	cm <sup>3</sup> /1000 strokes	Note changed to } rev/min	rev/men	cm:/1000 strokes 5	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	trav <del>el</del> mm 9
1100	109,5-111,5 (107,5-113,5)	1140-1150*	500	104,0-107,0 (102,0-109,0)	100	19,5-21,0 mm RW **		

Checking values in brackets

\* 1 mm less control rod travel than cot 2

# Test Specifications Fuel Injection Pumps and Governors

40

WPP 001/4 FZA 12,9 a
2. Edition

En

PE 6 P 120 A 720 LS 3803 RQ 300 / 1200 PA356 Testing with T nozzles and fuel lines 8 x 2 x 1000 according to ... W 400/305 supersedes 2.81
company Fiat
engine 8260.02

1 - 6 - 5 - 4 - 3 - 2 0 -75 -120-195-240-3150 (± 0,75°)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

(3.45 - 3.65)

mm (from BDC)

Rotational speed rev/min:	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Oifference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
1200	9,3-9,4	17,3 - 17,7	0,5(0,9)			<u> </u>
300	5,9-6,	2,8-3,6	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checkini			Full-load speed regulation Setting point   Test specifications			Idle speed regulation Setting point Test specifications				Torque o	ontrol
rev/min	Control rod travel mm	rev/min	Control red travel rnm 4	rev/min 5	Control rod travel mm 6	rev/min 7	Control red travel mm 8		Control rod travel mm 10	1	Control rod travel mm 12
650	15,6-16,4	650	16,0	-	1280-1310		6,0	300	min 7,5 5,9-6,1 440 =2,0	1200 650	9,3-9,4 9,3-9,5

Torque-control travel on flyweight assembly dimension a =

mm

Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	ontrol lever	Control rod stop	Fuel delivi	ery characteristics	Starting h	uel delivery
Test oil temp 40°C (104°F)  rev/min cm³/=1000 strokes  1 2		rev/min 3	rev/min	cm³/~1000 strokes 5	rev/min	cm <sup>3</sup> /100 strokes 7
1200	173,0 - 177,0 (170,0 - 180,0)	-	-	-	1	19,5=21 mm RW 28,0-36,0

Checking values in brackets

1.83

**BOSCH** 

### **Test Specifications** Fuel Injection Pumps (A) and Governors

WPP 001/4 MB 9,5 a 5

1. Edition

PES 5 P 110 A 820 LS 434 RSV 350-1100 P0/485 1 - 3 - 5 - 4 - 2 je 72°  $\pm 0.5^{\circ}$  ( $\pm 0.75^{\circ}$ )

supersedescompany Daimler-Benz OM 409 137 kW (186 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

Testoil-ISO 4113

3,0 - 3,1(2.95-3.15)

mm (from BDC)

Rotational speed rev/mih	Control rod travel mm 2	Fuel delivery cm³/100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
1080	10,9+0,1	12,0-12,2	0,4 (0,8)			
350	6,8-7,0	1,1-1,7	0,4 (0,7)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Degree of deflection	rated speed Control rod travel mm		Intermed	liate rated	speed	Control- lever deflection in degrees 7		rated speed Control rod travel mm	I ( U )	rque control  Control rod  travel  mm   11
loose	800 x =	0,3-1,0 2,25	-	-	-	-	-	-	-	-
ca. 34	9,9 4,0 1300	1120-1130 1180-1210 0,3-1,7								

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

	ill-load stop	6 Rotational- speed irritat		el delivery aractenstics	Starting f	uel delivery 5	4a) Idk	e stop
rev/min	cm³/1000 strokes	Note: changed to ) rev/min 3	rev/min	cm <sup>3</sup> /1000 strokes 5 <sup>t</sup>	rev/min	cm <sup>3</sup> /1000 strokes 7	rev/min	travel mm
1080	120,0-122,0 (117,0-125,0)	1120-1130*	-	•	100	130,0-150	0 -	-

Checking values in brackets

\* 1 mm less control rod travel than col 2

# Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 FOR 5,9 £ 3

1. Edition

PES 6 A 90 D 210 RS 2629

RSV 350-1300 AOB 2139 L

supersedes

company: Ford GB

engine: 380

At port closing the locating pin must engage in the slot the pointer.

En

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke 2,7 - 2,8 mm (from BDC)

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	cm³/ 100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes	mm 6
1250	12,9+0,1	7,2-7,3	0,3(0,45			
350	6,4-6,5	0,9-1,3	0,2(0,4)			
					•	

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper	rated speed		Intermediate	rated spe	ed	4 Lowe	r rated spe	ed	3 Tor	que control
Degree of deflection of control	1		Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel	rev/m <del>i</del> n	Control rod travel
lever 1	rev/min 2	mm 3	4	5	6	7	8	9	10	11
loose	800	0,3-1,0	-	-	•	ca. 34	350	6,0	-	-
	x =	2,75			٠		100	min.19,0		
<b>€3.</b> 68	11,9 4,0 1670	1365-1375 1505-1535 0,3 - 1,7					350 515- 650	6,4-6,6 575=2,0mm max. 1,0	.5	

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

2 Full-k	ead stop	6 Rotational- speed limitat.		delivery racteristics	Starting Idle	fuel delivery	(Sa) 108	e stop
Test oil tem rev/min 1		Note: changed to rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min	cm³/1000 strokes 7	rev/min 8	Control rod travel mm
1250	72,0-73,0 (70,0-75,0)	1365-1375 *	-	<b>-</b>	100	19,5-21,0 mm RW		-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

WPP 001/4 UNI 9,6 b1

1. Edition

PES 6 P 110 A 820 RS 424

RQ 275/1300 PA 573

supersedes...

company: IVECO-UNIC 8220-02

148 kW (204 PS)

Testoil-ISO 4113

#### A. Fuel Injection Pump Settings

Port closing at prestroke

Rotational speed rev/min 1	Control rod travet mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1300	10,5+0,1	9,5-9,7	0,4(0,8)			
275	4,9-5,1	1,2-1,8	0,4(0,7)			
	•					

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checkin PRG che	•		Full-load speed regulation Setting point   Test specifications 4			Idle speed regulation Setting point   Test specifications (5)				Torque o	(3)
rev/min 1	Control rod travel mm	rev/min 3	rad travel rmm 4	Centrel red travel mm	rev/min	rev/min 7	Control red travel rnm 8	rev/min 9	Control rod travel mm	rev/min	Control rod University
600	15,6-16,4	600	16,0		1345-1360 1410-1440 0 - 1,0	275	5,0	100 275 360-	min.6,5 4,9-5,1 400= 2,0		10,5-10,6 10,5-10,7

Torque-control travel on flyweight assembly dimension a =

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	elivery on control lever np. 40°C (104°F)	Control rod stop 3a	Fuel delive	ery characteristics	<b>/</b> C N	Starting fi Idle spee	d Control
rev/min 1	cm³/-1000 strokes	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5		rev/min 6	cm <sup>3</sup> /1000 strokes:/ mm 7
1300	95,0-97,0 (92,0-100,0)	-	-	-		100	140,0-160,0

Checking values in brackets

# Test Specifications Distributor-type Fuel-injection Pumps

WPP 001/4 PER 5,8e

1. Edition

VE 6/12 F 1300 L 107 0 460 406 027

Nozzle-and-holder assembly company: Perkins 1 688 901 020 (172 + 3 bar) engine:

Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

0,35

mm +0,02 (0,04)

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Tirning device travel	-	-	mm	•	
1.2 Supply pump pressure	1000	4,2-4,8	bar (kgf/cm²)	0,75	
1.3 Full-load delivery without charge-air pressure	500	67,0-71,0	cm <sup>3</sup> /1000 strokes	0	
Full-load delivery with charge-air pressure	1000	95,5-96,5	cm <sup>3</sup> /1000 strokes	0,75	3,5
1.4 Idle speed regulation	200	8,0-12,0	cm <sup>3</sup> /1000 strokes	0	3,5
1.5 Start	100	min. 90,0	cm <sup>3</sup> /1000 strokes	0	
1.6 Full-load speed regulation	1450	32,0-38,0	cm <sup>3</sup> /1000 strokes	0,75	
1.7 Load-dependent start of delivery					

2. Test Spe	cifications	checking values in brackets (	)
2.1 Timing device	n = rev/min mm	blockiert	
2.2 Supply pump LDA=0,75bar	n = rev/min ber (kgt/cm²)	400 2,0-2,6	1300 5,8-6,4
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	500 55-138(40-153)	1300 55-138(40-153)
2.3 Fuel deliveries	ــــــــــــــــــــــــــــــــــــــ		3. Dimensions

Speed control lever	Rot speed rev/min	Fuel delivery cm³/1000 strokes	Charge-air press bar (kgf/cm²)
End stop .	1600	0	0,75
	1550	1,0-9,0 (0	-10,0) 0,75
	1450		0-40,0) 0,75
	1250		5-94,5) 0,75
	1000		0-99,0) 0,75
	<b>*</b> 600		0-89,0) 0,32
	500	(65,	3-72,7) 0
switch-off	1300	0	
idle stop	200	(5,0	-15,0)
	300	max. 7,0	
	450	0	
End stop	150	min. 90,0	
,	250	max. 65,0	1

Designation	tor assembly and adjustment mm
К	-
KF	5,2-5,3
MS	1,2-1,3
svs	max. 1,2
<b>к</b> к	20,2-22,2
KL	8,4-11,7
Observations *Manifol	d-pressure

compensator stroke = 4.5 mm.Correction at the

adjusting nut (46)

D<sub>6</sub>

BOSCH Geschäftsbareich KM.
O 1980 by Robert Boad
Imprimé en République

# **Test Specifications** Distributor-type Fuel-injection Pumps

WWP 001/4 PER 5,8c2

2. Edition

VE 6/12 F 1300 L 21-3

0 460 426 022

supersedes 4.82

Nozzle-and-holder assembly company: Perkins 1 688 901 020 (172 + 3 bar) engine: T 6.354

Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings	•	Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	600	2,2-2,8	mm	0,74	
1.2 Supply pump pressure	800	4,4-5,0	bar (kgf/cm²)	0,74	
1.3 Full-load delivery without	1000	70,5-73,5	cm <sup>3</sup> /1000 strokes	0	2,5(3,0)
charge-air pressure Full-load delivery with	1000	95,5-96,5	cm <sup>3</sup> /1000 strokes	0,74	
charge-air pressure 1.4 Idle speed regulation	270	8,0-12,0	cm <sup>3</sup> /1000 strokes	0	2,5(3,0)
1.5 Start	100	min. 80,0	cm³/1000 strokes	0	
1.6 Full-load speed regulation	1480	47,0-53,0	cm <sup>3</sup> /1000 strokes	0,74	
1,7 Load-dependent start of delivery					

2. Test Spec	ifications	checking values in bra	ackets ( )		_	
2.1 Tirming device	n = rev/min	400 0,4-1,2(0,1-	-	00 8-3,2)	800 3,8-4,6(3,	5-4,9)
LDA=0,75bar 22Supply pump	n = rev/min ber (kgf/cm²)	400 2,7-3,3			1300 6,5-7,1	
LDA=0,75bar Overflow delivery	n = rev/min cm³/10 s	500 55-111(40-1	26)		1300 55-111(40-	126)
2.3 Fuel delivenes Speed control lever	Rot. speed	Fuel delivery		Charge-air press.	3. Dimer	ISIONS for assembly and adjustment mm
End stop	1550 1480 1300 1000 1000 * 700 500	max. 12,0 86,0-88,0 82,0-84,0)	(46,0-54,0) (85,2-89,8) (69,7-74,3) (93,7-98,3) (80,7-85,3) (65,0-71,0)	0,74 0,74 0,74 0 0,74 0,20	K KF MS SVS	3,2-3,4 5,1-5,3 0,9-1,1 max. 6,0
switch-off	1300	C			xP xK	20,2-22,2
End stop	330-410 270 120 230	0 min. 80 max. 75	(6,0-14,0)		compens = 4,5 m Correct	d-pressure ator stroke m. ion at the ng nut (46)
2.4 Solenoid	mex. cut-in volte	90				

Test Specifications Distributor-type Fuel-injection Pumps

PER 5,8 c4 WWP 001/4

Edition

supersedes

VE 6/12 F 1300 L 21-2 0 460 426 013

Nozzle-and-holder assembly company: 1 688 901 020 (172 + 3 bar) engine:

9.82 Perkins T6.354.4

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting 0,45	mm		see VDT-W-460/		
1. Settings	Rot. speed rev/min				Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	600	2,5-2,9	min	0,65	
1.2 Supply pump pressure	600	3,8-4,4	bar (kgf/cm²)	0,65	
1.3 Full-load delivery without charge-air pressure	1000	78,5-82,5	cm <sup>3</sup> /1000 strokes	0	
Full-load delivery with charge-air pressure	1000	92,5-93,5	cm³/1000 strokes	0,65	3,0(3,5)
1.4 Idle speed regulation	270	8,0-12,0	cm³/1000 strokes	0	3,0(3,5)
1.5 Start	100	min. 78,0	cm <sup>3</sup> /1000 strokes	0	
1.6 Full-load speed regulation	1480	42,0-50,0	cm³/1000 strokes	0,65	
1.7 Load-dependent start of delivery					

2. Test Spec	ifications	checking values in b	rackets ( )				
21 Timing device LDA = 0.65 ba	n = rev/min	400 0,7-1,5(0,4-1,8) 600 (2,0-3,4)			800 3,8-4,6(3,5-4,9)		
2.2 Supply pump LDA = 0,65 ba	n = rev/min ber (kgf/cm²)	400 3,0-3,6					
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	500 55-138(40-	153)	1300 55-138(40-153)			
2.3 Fuel deliveries  Speed control lever	Rot. speed	Fuel delivery		Charge-air press. ber (kgf/cm²)	3. Dimer	ISIONS for assembly and adjustment mm	
End stop .	1550 1480 1300 1000 1000 * 700 500	max. 9,0 86,5-89,5 84,5-88,5 68,5-72,5	(41,0-51,0) (83,0-93,0) (90,0-96,0) (77,5-83,5) (83,5-89,5) (66,8-74,2)	0,65 0,65 0,65 0,65 0 0,32	K KF MS SVS	5,1-5,4 0,9-1,1 max.6,0	
switch-off	1300	0			ੈxk ₹L	20,2-22,2	
End stop	330-420 270 150 230	0 min. 78 max. 75	(5,0-15,0)		compen = 4,0	ld-pressure sator stroke mm. tion at the	
2.4 Salenaid	mex. cut-in voltes	je			adjust	ing nut.(46)	

# **Test Specifications** Fuel Injection Pumps (A) and Governors

WPP 001/4 SCA

3. Edition:

PE 6 P 110 A 720 RS 3040

RSV 350-1100 P1/481

10.81 Scania DS 11 Tractor

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Testoil-ISO 4113

3,3-3,4 (3,25-3,45)

mm (from BDC)

RW 9,0-12,0 mm

Rotational speed rev/min	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
1100	12,3+0,1	15,8-16,0	0,4(0,8)			
350	3,6-3,8	0,9-1,3	0,2(0,4)			
				1		
						1

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

(1) Uppe	r rated speed	rev/min	Intermediate rated speed			<b>(4)</b>	Lower	(3) To	rque control	
Degree of deflection	Control rod travel	Control rod travel				Control-		Control rod travel		Control rod travel
of control	ram .	mm rev/min				deflection in degrees	rev/min	നന	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
loose	800	0,3-1,0	-	-	-	ca. 26	350	3.2		
	x =	2,75						min. 20,0 3,6-3,8		
ca.51	11,9 4,0 1350	1140-1150 1190-1220 0,3-1,7					400-460			

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

	ill-load stop emp. 40°C (104°F)	Rotational- speed limitat.		iel delivery Paracteristics	Starting f	uel delivery 5	Idle stop		
rev/min 1	cm³/1000 strokes	changed to) rev/min 3	rev/min	cm3/1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes 7	rev/min	travel mm 9	
1100	158,0-160,0 (155,0-163,0) 1140-1150*			159,0-163,0 (156,0-166,0)	100	210,0-260, = RW 20,0 21,0 mm		-	
					350	9,0-13,0			

Checking values in brackets

\* 1 mm less control rod travel than col 2



# **Test Specifications Fuel Injection Pumps** and Governors

WPP 001/4 MB 5,7 v 9

2. Edition

En

PES 6 A 90 D 410 RS 2596

RSV 350-750 AOB 741 L

supersed& 82

companyDajmler-Benz

engine: OM 352 A

65 kW (88 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at pres	troke	2,0 - 2,1 mm (from BDQ RW 9,0 - 12,0 mm								
Rotational speed rev/min	Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm³/ 100 strokes	Control rod travel	Fuel delivery  cm³/100 strokes	Spring pre-tensioning (torque-control valve)				
1	2	3	4	2	3	6				
700	13,0+0,1	6,6 - 6,7								
100	-	7,8 - 8,8								
					1					

Adjust the fuel delivery from each outlet according to the values in [

#### **B.** Governor Settings

Upper	rated speed		mtermediate	rated spe	ed	4 Lowe	r rated spe	ed	(3) To:	rque control
Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	Control rod travel
1	2	3	4	5	6	7	8	9	10	11
loose	500	0,3-1,0	-	-	-	ca. 14	350	8,1	-	-
	x =						100	min.19,0		
3.26	12,0 4,0 850	750-755 788-801 0,3-1,7					360-42	0 = 2,0		

The numbers denote the sequence of the tests. Set auxiliary idle spring at 2.0 mm control-rod travel.

#### C. Settings for Fuel Injection Pump with Fitted Governor

2 Full+	oad stop	6 Rotational- speed limitat.				fuel delivery	5a idle stop	
Test oil temp. 40°C (104°F) rev/min cm³/1009 strokes 1 2		Note: changed to rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min cm³/1000 strokes 6 7		rev/min 8	Control rad travel mm
700	65,5-66,5 (63,5-68,5)	7 <i>5</i> 0-755*	-	-	100	71,0-81,0	-	-

Checking values in brackets

\* 1 mm less control rod travel then col. 2

# Test Specifications Fuel Injection Pumps and Governors

40

WPP 001/4 MB 11,4 1 4

2. Edition

En

PES 6 P 110 A 820 LS 442

RSV 350-750 P 1/487

supersedes 4.82

company: Daimler-Benz

engine: OM 407

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

Testoil-ISO 4113

3,2-3,3 (3,15-3,35)

170m (from BDC)

Rotational speed rev/min	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes	Ditierence cm³/ 100 strokes	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
730	11,7+0,	1 11,9 - 12,1	0,4(0,8)			
350	7,3-7,5	1,3 - 2,1	0,4(0,7)			
	ľ					

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings.

Upper	rated speed		Intermediate rated speed			( Lowe	r rated spe		3 Torque control	
Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel		Control rod travel
lever	rev/min	mm .	lever	rev/min	mm	lever .	ten/with	mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
loose	800	0,3-1,0	-	•	•	-	-	-	-	-
:	X=	2,5								
⊸ca.	10,7	750-755	. <u>.</u>							
©Ca.	4,0		ł			i .		l	l	1
	850	0,3-1,7	1						<u> </u>	

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

2 Full-lo	ed stop	6 Rotational- speed limitat. 3a Fuel delivery characteristics			Starting Idle	fuel delivery	(5a) idle stop	
Test oil temp. 40°C (104°F)  rev/min cm²/1000 strokes: 1 2		Note: changed to rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	r <del>av/min</del> 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm
730	119,0 - 121,0 (116,0 - 124,0	750-755* )	•	-	100	130,0-150,0	-	•

Checking values in brackets

\* 1 mm less control rod travel than col. 2

# Test Specifications Fuel Injection Pumps and Governors

40

WPP 001/4 MB 11,4 L 1 2. Edition

Testoil-ISO 4113

PES 6 P 110 A 820 LS 442

RQ 300/1100 PA 327-2

supersede 8.81
Daimler-Benz
company
OM 407 h
engine: 177 kW (241 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

3,2 - 3,3

mm (from BDC) Zyl. 6

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	11,3+0,1	12,5 - 12,7	0,4(0,8)		<u> </u>	4 .
300	7,7-7,9	1,3 - 1,9	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Checking	g of slider	Full-load	peed re	gulation		Idle spec	speed regulation Torque control			control	
rev/min	Control rod travel mm 2	Setting por	Control rod travel	rev/min	cifications Control rod travel mm	Setting previous	Control red travel		cifications Control rod travel mm	rev/min	Control rod trav <del>el</del> mm
600	. 13,0-14,0	600	13,5		1145-1160 1180-1210 0 - 1,5			300	min. 9,4 7,7-7,9 2,0 mm	-	-

Torque-control travel on flyweight assembly dimension a =

mm.

Speed regulation: #145 - 1160 min -1

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	elivery on control lever np. 40°C (104°F)	Control rod stop	Fuel deliv	ery characteristics	Starting f	uel delivery
rev/min 1	cm <sup>3</sup> /~1000 stroke%	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	cm <sup>3</sup> /100 strokes 7
1100	125,0 - 127,0 (122,0 - 130,0)		600	110,0 - 114,0 (107,0 - 117,0)	100	130,0 - 150,0

Checking values in brackets

PES 5 P 110 A 820 LS 434

RQ 300/1100 PA 327-3

1 - 3 - 5 - 4 - 2 je  $72^{\circ} \div 0,5^{\circ} (0,75^{\circ})$ 

supersedes 8.81 ?.37
company Daimler-Benz
OM 409
141 kW (192 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

(2,95-3,15)

mm (from BDC) Zy1.

Rotational speed rev/min	Control rod travel mm 2	Fuel delivery  cm³/100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	10,7+0,	1 12,0 - 12,2	0,4(0,8)			
300	7,0-7,	1,2- 1,8	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checking	g of slider	Full-load s	peed re	gulation		idle spec	ed regula	ition		Torque o	ontrol
		Setting po	int	Test specifications		Setting point   Tes		Test spe	Test specifications		6
rev/min	Control rod travel mm	rev/min	Control red travel rnm 4	rev/min	Control rod travel mm	rev/min 7	Control rod travel rnm	rev/min	Control rod travel mm 10	rev/min	Control rod travel mm 12
600	13,8-14,6	600	14,2		1145-1160 1175-1205		7,1	100 300	min.10,0 7,0-7,2		-
								375-	415=2,0		

Torque-control travel
on flyweight assembly dimension a =

mm

Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d	elivery on control lever np. 40°C (104°F)	Control rod stop	Fuel deliv	ery characteristics	Starting fuel delivery		
rev/min	cm <sup>2</sup> /-1000 strakes	rev/min	rev/min	cm³/-1000 strakes	rev/min	cm <sup>3</sup> /100 strokes	
1100	120,0 - 122,0 (117,0 - 125,0)	-	600	108,0 - 114,0 (105,0 - 117,0)	100	130,0 - 150,0	

Checking values in brackets

1.83

BOSCH

# Test Specifications Fuel Injection Pumps 2 and Governors

40

WPP 001/4 MB 9,5 a 4 1. Edition

<u>n</u>

PES5P110A820 LS 434

RQ300/1100 PA 327-4

supersedes .

company: Daimler-Benz

engine:

OM 409

135 kW (184 PS)

1 - 3 - 5 - 4 - 2 je  $72^{\circ} \div 0.50^{\circ} (\div 0.75^{\circ})$ 

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

**Testoil-ISO 4113** 

3,0-3,1 /2 05 2 45\

mm (from BDC

Rotational speed rev/min	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> / 100 strokes 4	Control rodi travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100 300	11,1+0,1 8,0-8,2		0,4(0,8) 0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Checkin PRG chi	( )	Full-load sp Setting poi	int	Test spec		idle spec Setting p			cifications (5)	Torque o	. (3)
rev/min	Control rod travel mm		red travel	Central red travel rm/m 5	rev/min 6	rev/min 7	Control red Stavel rmm 8		Control rod travel mm	rev/min 11	Control rod travel mm
. 600	13,8-14,6	600	14,2	10,1 4,0 1300	1145-1160 1175-1205 0 - 1,0		7,1	100 300	min. 8,7 7,0-7,2	-	-

Torque-control travel
on flyweight assembly dimension a

mm

Speed regulation: At 1145-1160 min-1

1 mm less control

#### C. Settings for Fuel Injection Pump with Fitted Governor

	elivery on control lever np. 40°C (104°F)	Control rod stop 3a	Fuel deliv	ery characteristics	36)	Starting fi idle spee	! Cantra
rev/min	cm³/=1000 strokes	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes		rev/min	rad savel cm <sup>2</sup> /1000 strokes:/ mm
1100	110,0-112,0 (107,0-115,0)	-	600	94,0-98,0 (91,0-101,0)		100	130,0-150,0

Checking values in brackets

1.83

BÒSCH

3eschäftsbereich KM. Kundendienst. Kfz-Auerüstung. D 1987 by Robert Bosch GmbH. Postfach 50, D-7000 Stuttgart 1. Printed in the Federal Republic of Germany. mprimé en République Fédérale d'Alfernagne par Robert Bosch GmbH.

2

## **Test Specifications** Fuel Injection Pumps 2 and Governors

WPP 001/4 MB 11,4 12

3 . Edition

PES 6 P 110 A 820 LS 442

RO 300/950 PA 483

supersedes 3.82

company: Daimler-Benz

OM 407

162 kW (220 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

mm (from BDC) Zy]. 6

	(-	3,13-3,331				
Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tansioning (torque-control valve) mm 6
950	12,1+0,1	12,2 - 12,4	0,4(0,8)			
300	8,0-8,2	1,4-2,0	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

**B. Governor Settings** 

Checkin PRG che		Full-load a Setting po	*	-	cifications (4)	Idle spec Setting p	-		cifications (5)	Torque o		3)
rev/min	Control rod travel mm	rev/min	Control red travel rnrn 4	Central red travel mm	rev/min	rev/min 7	Central red travel rnm 8	r <del>ev</del> /min 9	Control rodi travel mm	rev/min	Control rod travel mm 12	
600	13,0-14,0	600	13,5	11,1 4,0 1150	995-1010 1010-1045 0 - 1,0		8,1	300	min.9,7 8,0-8,2 50=2,0mm	-	-	
Torrier	control travel			-	<u> </u>		9	95 -	1010 min =	1	1 mm less con	

Torque-control travel on flyweight assembly dimension a

Speed regulation: At

1 mm less control

#### C. Settings for Fuel Injection Pump with Fitted Governor

	delivery on control lever mp. 40°C (104°F)	Control rod stop	Fuel deliv	ery characteristics 36	Starting for the speed	Contrib
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	red travel crm <sup>3</sup> /1000 strokes:/ mm 7
950	122,0 - 124,0 (119,0 - 127,0)		600	118,0 - 122,0 (115,0 - 125,0)	100	140,0 - 160,0

Checking values in brackets

WPP 001/4 MB 8,7 1

2. Edition

PE6A90D410RS2124

RQ 450/1250 AB 812

supersedes 11.80 companyaimler-Benz on 360 engine: 141k½ (192 PS)

1 - 5 - 3 - 6 - 2 - 4  $0 - 60-120-180-240-300^{\circ} \pm 0.5^{\circ} (\pm 0.75^{\circ})$ 

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings
(2,10-2,30)
Port closing at prestroke
2,15-2,25
m

mm (from BDC)

Rotational speed	Control rod travel mm	Fuel delivery  cm³/100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
1250	10,2+0,	1 8,6 - 8,7	0,3(0,4	)		
450	5,9-6,1	1,2-1,8	0,2(0,4)		,	

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checking PRG che		(1)	Full-load s Setting po	int	Test spec	cifications (4)	Idle spec	point		cifications (5)	Torque o	3
rev/min	Control re travel mm	ĸ	rev/min	Centrel red travel rnm 4	Centrel red travel mm · 5	rev/min	rev/min	red tavel mm	rev/min 9	control rod travel mm	rev/min	travel   mm
700	15,6-	16,4	700	16,0		1295-1310 1345-1375	1	6,0	450 600	min. 7,5 5,9-6,1 0 - 1, 540=2,0		-

Torque-control travel on flyweight assembly dimension a

Speed regulation: At

1295-1310 min

1 mm less control

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de governor ce Test oil tem		Control rod stop	Fuel deliv	ery characteristics 36	Starting fi	Combru
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	red travel cm <sup>3</sup> /1000 strokes:// mm 7
1250	86,0 - 87,0 (84,0 - 89,0)	800	800	80,0 - 83,0 (78,0 - 85,0)	100	19,0-21,0 mm RW

Checking values in brackets

Testoil-ISO 4113

# Test Specifications Distributor-type Fuel-injection Pumps

46

WPP 001/4 VWW 2,4 c

1. Edition

\_\_\_\_\_

supersedes

company: VWW engine: 087 T

0 460 406 021

VE 6/10 F 2400 L 116-3

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

mi

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Tirning device travel	1500	1,5 - 1,9	mm	0,75	
1 2 Supply pump pressure	1500	5,7 - 6,3	bar (kgf/cm²)	0,75	
1.3 Full-load delivery without charge-air pressure	600	25,5 -26,5	cm <sup>3</sup> /1000 strokes	0	
Full-load delivery with charge-air pressure	1500	44,0 -45,0	cm <sup>3</sup> /1000 strokes	0,75	3,0
1.4 Idle speed regulation	375	6,0 -10,0	cm³/1000 strokes	0	3,0
1.5 Start	100	min. 42,0	cm³/1000 strokes	0	
1.6 Full-load speed regulation	2600	10,0 -16,0	cm <sup>3</sup> /1000 strokes	0,75	
1.7 Load-dependent start of delivery					

2. Test Spec	cifications	checking values in bra	ackets ( )			
2.1 Tirming device	um = LeA/Will	1200 0,2-1,0(0-1	1500 (1,0-2		2400 ,2(5,1-6,5)	
22 Supply pump LDA=0.75bar	n = rev/min bar (kgf/cm²)	600 3,3-3,9	)		2400 8,1-8,7	
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	600 55-138(40	-153)	5	2400 5-138(40-15	3)
2.3 Fuel delivenes					3. Dimer	ISIONS tor assembly and adjustment
Speed control lever	Rot speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	mm
End stop	2750 2600	max. 4,0	(9,0-17,0)	0,75 0,75	K	3,2-3,4
	2400 1500	35,0-37,0	(33,7-38,3) (42,2-46,8)	0,75 0,75	KF MS	6,3-6,6 1,7-1,9
	* 800 600	32,5-33,5	(30,0-36,0) (23,0-29,0)	0,30	svs	2,4
						04 0 22 0
switch-off mech.	2400	0			XK	21,8-23,8
elektr.	400	0				
idle stop	375 600	max. 3,0	(4,0-12)		Manifold-presssure compensator stroke	
End stop	400 500	min. 20,0 max. 30,0				n. ion at the ng nut (46)
2.4 Solengid	max.cut-m voltag	<ul><li>xxx min. rated voltage</li></ul>				

**BOSCH** 

Testoil-ISO 4113

Test Specifications
Distributor-type
Fuel-injection Pumps

44

WPP 001/4 VWW 1,6 V

2. Edition

VE 4/9 F 2000 R 86

0 460 494 088

company: VWW

engine: 086-1.6 Bell

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

- mm

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1,1 Timing device travel	1500	2,9-3,3	mm		
1.2 Supply pump pressure	1500	4,9-5,5	bar (kgf/cm²)		
1.3 Full-load delivery without charge-air pressure	1500	33,5-34,5	cm <sup>3</sup> /1000 strokes		2,5(3,0)
Full-load delivery with charge-air pressure			cm³/1000 strokes		
1 4 Idle speed regulation	350	5,0-9,0	cm <sup>3</sup> /1000 strokes		2,5(3,0)
1.5 Start	100	min.38,0	cm³/1000 strokes		
1.6 Full-load speed regulation	2100	21,0-27,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery					

2. Test Spec	cifications	checking values in brackets (	)			
2.1 Tirming device	u = len/unu	1000 1,3-2,1(1,0-2,4)	1500 (2,4-3,8	_	000 4(4,3-5,7)	
2.2 Supply pump	n = rev/min bar (kgf/cm²)	400 2,1-2,7		2000 6,0-6,6		
)verflow delivery	n = rev/min cm <sup>3/</sup> 10 s	600 55-138(40-153)			2000 8(40 <b>-</b> 153)	
2.3 Fuel deliveries				3. Dimer	for assembly	
Speed control lever	Rot. speed	Fuel delivery cm³/1000 strokes	Charge-air press. bar (kgf/cm²)	Designation	and adjustment mm	
End stop	2200 2100 2000 1500 600	0,5-7,5 (0-8,0) (20,0-28, 27,0-29,0 (25,7-30, (31,7-36, 22,0-25,0 (20,5-26,	3)	K KF MS SVS + FH	3,2-3,4 5,7-5,9 1,2-1,4 max. 2,5 1,8-2,4	
switch-off elect.	400	0		XK B XL	18,4-20,4 6,1-8,4	
idle stop	460	max. 1,5 (3,0-11,	0)	Observations		
End stop	400 500	min. 18,5 max. 24,0				
2.4 Solenoid	max. cut-in voltag	• xxx min. 10,0 V rated voltage 12V.	·			

Testoil-ISO 4113

Test Specifications
Distributor-type
Fuel-injection Pumps

46

WPP 001/4 Volvo 3,6 g<sup>1</sup>
1. Edition

n

VE 6/11 F 1800 L 19-7 O 460 416 025 supersedes company: VO1VO

engine: TAMD 40 B (121 kW)

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Banches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

0,2

mm <sup>+</sup>0,02 (0,04)

see VDT-W-460/...

1. Settings	Rot. speed rev/min			Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	2,6-3,0	mm		
1 2 Supply pump pressure	1500	6,2-6,8	bar (kgf/sm²)		
1.3 Full-load delivery without charge-air pressure	1500	78,0-79,0	cm <sup>3</sup> /1000 strokes		3,0(3,5)
Full-load delivery with charge-air pressure	-	-	cm <sup>3</sup> /1000 strokes		
1.4 Idle speed regulation	400	8,5-12,5	cm <sup>3</sup> /1000 strokes		3,0(3,5)
1.5 Start	100	min. 60	cm <sup>3</sup> /1000 strokes	İ	
1.6 Full-load speed regulation	1900	43,5-49,5	cm <sup>3</sup> /1000 strakes		
1.7 Load-dependent start of delivery	-	-			

2. Test Spe	cifications	checking values in brackets ( )			
2.1 Timing device	u = tea/win	1000 0,7-1,5(0,4-1,8)	1500 (2,1-3,5)	3,6-4	1750 1,4(3,3-4,7)
2.2 Supply pump	n = rev/min bar (kgf/cm²)	400 2,3-2,9			1750 7,1-7,7
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	600 55-138(40-153)		55-13	1800 38(40 <b>-</b> 153)
2.3 Fuel deliveries  Speed control lever	Rot. speed	Fuel delivery	Charge-air press.	3. Dimer	ISIONS for assembly and adjustment mm
End stop	2130 2050 1900 1770 1500 600	max. 2,5 6,5-12,5(5,0-14,0) (42,0-51,0) 72,8-75,8 (71,6-77,0) (75,8-81,2) 66,5-70,5 (65,1-71,9)		k KF MS SVS	- 5,9-6,1 1,4-1,6 max. 2,3
switch-off				XX B XL	18,7-20,7
idle stop	580 500 400	0 max. 2,0 (6,0-15,0)		Observations	
End stop	120 220	min. 60 max. 60			
2.4 Solenoid	mex. cut-in voltes	xxxx min. 10 V rated voltage 12V.			

Testoil-ISO 4113

**Test Specifications** Distributor-type Fuel-injection Pumps

WPP 001/4 PEU 1,9a

1. Edition

VE 4/9 F 2300 R 114 0 460 494 112

supersedes"

company: Peugeot engine: XUD g

see VDT-W-460/...

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers O) (T)

Test Instructions and Test Equipment

Pre-stroke setting

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	2000	7,8-8,2	mm		
1.2 Supply pump pressure	2000	5,9-6,5	bar (kgf/cm²)		
1.3 Full-load delivery without charge-air pressure	1250	31,5-32,5	cm <sup>3</sup> /1000 strokes		2,5
Full-load delivery with charge-air pressure	-	-	cm <sup>3</sup> /1000 strokes		
1.4 Idle speed regulation	300	25,0-29,0	cm³/1000 strokes		3,0
1.5 Start	100	min. 45	cm <sup>3</sup> /1000 strokes		
1.6 Full-load speed regulation	2500	7,0-13,0	cm³/1000 strokes		
1.7 Load-dependent start of delivery	2000	-			

2.1 Timing device	n = rev/min	1000		1250		2000
	mm	2,0-3,0(1,8	3-3,2) 3	,4-4,2(3,1-4	1,5)	(7,3-8,7)
2.2 Supply pump	n = rev/min bar (kgf/cm²)	600 2,0-2,6	5	1250 3,9-4,5		
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	600 55 <b>-</b> 111(40-1	126)		5	2300 5-111(40-126)
2.3 Fuel delivenes		1			3. Dimer	1SiONS for assembly and adjustment
Speed control lever	Rot. speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	mm
End stop	2650 2500 2400 2250 2000 1250 600		(6,0-14,0) (20,0-28,0) (25,7-30,3) (26,7-31,3) (29,7-34,3) (25,5-31,5)		K KF MS SVS	3,3 5,7-5,9 1,3-1,5 max. 4,0
switch-off					XÎK B XL	18,9-20,9
idle stop	300 400 450-550	max. 10,0	(23,0-31,0)		Observations	
End stop	250 500	min. 45 max. 35				
2.4 Solenoid	max. cut-in voltage	xxxx min	. 10 V e 12V.			

Test Specifications
Distributor-type
Fuel-injection Pumps

46

WPP 001/4 REN 2,0 e 2. Edition

<u>En</u>

VE 4/9 F 2400 R 95 O 460 494 105 supersedes6.82 company: Renault engine: F 8 M

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

mm

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1400	4,1-4,5	mm		
1 2 Supply pump pressure	1400	4,9-5,5	bar (kgf/cm²)		
1.3 Full-load delivery without charge-air pressure	1000	30,0-31,0	cm³/1000 strokes		2,5(3,0)
Full-load delivery with charge-air pressure	-	-	cm³/1000 strokes		
1 4 Idle speed regulation	425	6,0-10,0	cm³/1000 strokes		2,5(3,0)
1.5 Start	100	min. 42,0	cm³/1000 strokes		
1 6 Full-load speed regulation	2650	10,5-16,5	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery	1400	-			
	į.			!	

2. Test Spe	cincations					
2.1 Timing device	n = rev/min	1000	1400			2400
	Man	2,3-3,1(2,0	)-3,4) (3,6-5	6,0) 6,3-7,1	(6,0-7,4) 7	,0-7,7(6,6-8,0
2.2 Supply pump	n = rev/min	600				2400
	bar (kgf/cm²)	2,5-3,1			7	,7-8,3
Overflow delivery	n = rev/min	600	1			2400
	cm <sup>2</sup> /10 s	55-138(40-1	153)		55-13	8(40-153)
2.3 Fuel deliveries					3. Dimer	for assembly
Speed control lever	Rot. speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	and adjustment mm
End stop	2750	max. 6,0	/0 F 17 51			2 2 2 4
	2650	01 0 00 0	(9,5-17,5)		K	3,2-3,4
	2500	21,0-29,0	(21,0-29,0) (25,5-30,1)		KF	5,7-5,9
	2400	20,5-29,1	(25,5-30,1)			1,2-1,4
	2100	27,5-29,9	(26,4-31,0) (29,3-33,9)		MS	
	1400 1000	30,6-32,6	(28,2-32,8)		svs	2,8
	600	24,3-27,3				
switch-off					₹K	18,7-20,7
	2400	0			<b>₹</b> L	9,5-12,8
Idle stop	650	0			Observations	
	600	0,2-5,2				
	425		(4,0-12,0)			
End stop	330	min. 30,0				
4	500	max. 29,0				
2.4 Solenoid	mex. cut-in volte	e xxx min.	10,0 V			
	INGK HURYGNXXX	rated voltage	2 12V.	J		

# **Test Specifications** Distributor-type Fuel-injection Pumps

WPP 001/4 SOF 2,5c 2. Edition

VE 4/9 F 1950 R 22-4 0 460 494 070

superselles82 companyofim engine RJV-LKW

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

0.3 mm  $\pm 0.02 (0.04)$  mm

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings	•	Charge-air press. bar (kgf/cm²)	Difference in deliver; cm <sup>2</sup>
1.1 Timing device travel	1800	7,4-7,8	mm		
1.2 Supply pump pressure	1800	6,2-6,8	bar (kgf/cm²)	·	
1.3 Full-load delivery without charge-air pressure	1950	33,5-34,5	cm <sup>3</sup> /1000 strokes		2,5(3,0)
Full-load delivery with charge-air pressure			cm <sup>3</sup> /1000 strokes		
1.4 Idle speed regulation	350	6,0-10,0	cm³/1000 strokes		2,5(3,0)
1.5 Start	100	min.55,0	cm <sup>3</sup> /1000 strokes		
1.6 Full-load speed regulation	2150	14,0-20,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery					

2.1 Timing device	n = rev/min mm	400 1,9-2,7(1,6-3,0)	1100 4,9-5,5(4,5-5,9)	1800 (6,9-8,3)		
2.2 Supply pump	n = rev/min bar (kgi/cm²)	400 2,9-3,5	1100 4,6-5,2			
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	500 55-111(40-126)		195 55-111(4		
2.3 Fuel deliveries Speed control lever	Rot speed	Fuel delivery	Charge-air press bar (kgf/cm²)	3. Dimen	ISIONS for assembly and adjustment mm	
End stap	2250 2150 1950 1100 600	max. 10,0 (13,0-2 (31,7-3 37,7-40,3 (36,7-4 30,0-33,0 (28,5-3	6,3)	K KF MS SVS # FH	 5,4-5,6 1,7-1,9 max.2,7 1,8-2,4	
switch-off	1950	0		8		
idle stop  End stop	500 350 350	max.5,0 (4,0-12 min.32	2,0)	Observations *operat stroke		
2.4 Solenoid	480	max.34 min. 10 V rated volt	ago 12V			

**Test Specifications** Distributor-type Fuel-injection Pumps

WPP 001/4 VWW 1,6v1 3. Edition

VE 4/9 F 2000 R 85

0 460 494 086

6.82

Industrie-Motor

065.5 Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings	•	Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	2,9-3,3	mm		
1.2 Supply pump pressure	1500	4,9-5,5	bar (kgf/cm²)		
1.3 Full-load delivery without charge-air pressure	1500	32,5-33,5	cm <sup>3</sup> /1000 strokes		2,5(3,0)
Full-load delivery with charge-air pressure			cm <sup>3</sup> /1000 strokes		
1.4 idle speed regulation	425	6,0-10,0	cm <sup>3</sup> /1000 strokes		2,0(3,0)
1.5 Start	100	min. 38,0	cm <sup>3/1000</sup> strokes		
1.6 Full-load speed regulation	2050	9,0-15,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery					

2.1 Timing device	n = rev/min	1000		500 2,4-3,8)	2000 4,6-5,4(4	1,3-5,7)
2.2 Supply pump	n = rev/min bar (kgf/cm²)	600 2,8-3,4			2000 6,1-6,7	7
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	55-138(40-1	53)		2000 55-138(40	)-153)
2.3 Fuel deliveries					3. Dimer	1SiONS for assembly and adjustment
Speed control lever	Rot. speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	mm
End stop	2070	max. 2,0			K	3,2-3,4
	2050		(8,0-16,0)		KF	5,7-5,9
	2000	29,0-31,0	(27,7-32,3		MS	1,2-1,4
	1500		(30,7-35,3		svs	max. 2,5
	600	21,0-24,0	(19,5-25,5		+ FH	1,8-2,4
switch-off					XK	18,4-20,4
mech.	2000	0			Χ[В	13,6-17,0
elektr.	400	0				
idle stop	600 425	max. 2,0	(4,0-12,0)		+ *oper	
End stop	400 500	min. 17,5 max. 23,0		-	stro	oke (KSB)
24 Solenoid	max. cut-in volter	<pre>xxx min. rated volta</pre>	10,0 V ge 12V.			•

t Kf2-Ausrustung. Iffach 50, D-7000 Stuttgart 1: Photed in the Federal Republic of Germany

Testoil-ISO 4113

Test Specifications
Distributor-type
Fuel-injection Pumps

40

WWP 001/4 VWW 1,6v4 3. Edition

n

VE 4/9 F 1800 R 85-1 0 460 494 107 supersedes "6;82 company: VWW engine: 638/10

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

mm

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Serings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	2,9-3,3	mm		
1.2 Supply pump pressure	1500	4,9-5,5	bar (kgf/cm²)		
1.3 Full-load delivery without	1500	32,5-33,5	cm <sup>3</sup> /1000 strokes		2,5(3,0)
charge-air pressure Full-load delivery with			cm <sup>3</sup> /1000 strokes	<b>!</b>	
charge-air pressure 1.4 Idle speed regulation	425	6,0-10,0	cm <sup>3</sup> /1000 strokes		2,0(3,0)
1 5 Start	- 100	min. 38,0	cm³/1000 strokes		
1.6 Full-load speed regulation	1870	9,0-15,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery					

2.1 Timing device	u = sev/win	1,3-2,1(1,0-	2,1)	1500 (2,4-3,8)	1780 3,7-4,	5(3,4-4,8)	
2.2 Supply pump	n *./min bar (kgf/cm²)	600 2,8-3,4			1780 5,5-6,1		
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	600 55-138(40-15	3)		1800 55-138(4	0-153)	
2.3 Fuel deliveries Speed control lever	Rot speed	Fuel delivery		Charge-air press.	3. Dimen	Sions for assembly and adjustment mm	
switch-off elect.	1950 1870 1780 1500 600	max. 2,0 ( 29,9-31,9 (	30,7-35,3)		K KF MS SVS + FH XK XL	3,2-3,4 5,7-5,9 1,2-1,4 max. 2,5 1,8-2,4 18,4-20,4 9,7-13,1	
idle stop End stop	600 425 400 500	max. 2,0 (min. 17,5 max. 23,0	(4,0-12,0)		Observations + *operating stroke (KSB)		
2.4 Solenoid	max. cut in volta	• xxx min. 10  • rated voltage	•				

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 VOL 12,0 f1 2. Edition

PE 6 P 120 A 320 RS 3071

ROV 250-1025 PA 371

supersedez 81 company:Volvo

Values apply to

0

Testoil-ISO 4113

engine nozzle-and-holder assemblies 1 688 901 019 1 680 750 067 and engine fuel-injection tubing

engine: TD 120 GA

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

		mm (from BDC)			
Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
11,4+0,1	20,5-20,8	0,5(0,9)			
5,6-5,7	2,2-2,6	0,5(0,7)			
, ,,,	.,,.	3,3(3,7)			
	Control rod travel mm 2 11,4+0,1	Control rod travel  mm cm³/100 strokes  2 3  11,4+0,1 20,5-20,8	Control rod travel mm cm³/100 strokes 2  11,4+0,1 20,5-20,8  Time (rom soc) Control rod travel cm³/ 100 strokes 4  0,5(0,9)	Control rod travel mm cm³/100 strokes 2  11,4+0,1 20,5-20,8  Difference cm³/100 strokes 4  0,5(0,9)	Control rod travel  mm cm³/100 strokes  2  11,4+0,1  20,5-20,8  Control rod travel  cm³/ 100 strokes  4  Control rod travel  mm cm³/ 100 strokes  2  3  0,5(0,9)

#### **B. Governor Settings**

Upper rated s	peed			Intermediate	rated ap	eed		Lower rated	speed			Sidino e	loeve travel
deflection	rev/min Control	Control rod travel	<b>①</b>	Degree of deflection		Control n	od	Degree of deflection		Control re	xi		0
of control	rod travel	mm rev/men	2	of control	rev/min	mm	<b>(•)</b>	of control lever	rev/min	mm	(3)	rev/min	mm
1	2	3		4	5	6		7	8	9		10	11
max.	1100	15,2-17	,8	-	-	-		ca.12	100	min.7	,1	250	1,1-1,2
ca.40	10,4	1065-10	75						250	5,6-5	,7		2,9-3,3
	4,0 1300	1145-11 0 - 1,										1025	5,1-5,4 7,2
		,,						<b>②</b>					

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc Test oil ten	d stop	Rotational-speed (20) irrelation stermediate speed	Fuel delin high idle s	ery characteristics (Se	Starting fuel delivery 6 ldle switching point		Torque- travel	Control o
revimin	cth³/1000 strokes .	revimin 49	rev/min	cm²/1000 strokes	rev/min	cm¥1000 strokes	rev/min	travel mm
LDA 700	0,9 bar 205,0-208,0 (202,0-211,0	1065-1075*	LDA 700	0 bar 157,0-161,0 (154,0-164,0)	100	230,0-270,0 =RW 20,0- 21,0 mm	•	-

Chucking values in brackets

mm less control rad travel then col. 2

### **D. Adjustment Test for Manifold Pressure Compensator**

Test at n =

500

rev/min decreasing pressure – in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 6 PRS 3071 +RQV PA 371	0,57	0,90 0 0,33	11,0-11,1 11,4-11,5 9,0-9,1 9,9-10,1
·			

Notes

(1) when n =

rev/min and gauge pressure = bar (= maximum full-load control rod travel)

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 VOL 12,0 f 3

1. Edition

ROV 250-1025 PA 371 PE 6 P 120 A 320 RS 3071 Y

Values apply to engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1 680 750 067 company:Volvo engine: TD 120 G 213 kW (290 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at pres	stroke	(2.55-2.75)	mm (from BDC)	mm (from BDC)						
Rotational speed Control retravel		Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> / 100 strokes	Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (torque-control valve)				
1	2	3	1	2	3	6				
700	10,2+0,	1 17,5-17,8	0,6(0,9)							
250	5,7-5,9	2,2-2,6	0,3(0,6)							
İ										

Adjust the fuel delivery from each outlet according to the values in [

#### **B. Governor Settings**

Upper rated s	peed rev/min	Control rod	Intermediate	e rated sp	cod Control rod	Lower rated speed Degree of Control rod			_	Sliding sleeve trave		
deflection of control	Control rod travel mm	traval	deflection	rev/min 5	mm 4	deflection of control lever	rev/min 8	travel	③	rev/min 10	(1) mm 11	
max.	1100	15,2-17,	8 -	-	-	ca.12		min.7, 5.7-5,		F .	0,7-0,9 2,7 <b>-</b> 3,0	
ca. 42	9,2 4,0 1300	1145-117	5					390=2,0			4,7-5,0 6,9	
						<b>③</b>						

Torque control travel a

#### C. Settings for Fuei Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ten		Rotational-speed 20 imitation intermediate speed	Fuel deliningh idle s	very characteristics (5e)	Starting fuel delivery idle switching point		Torque- travel	control (5)
rev/min	cft <sup>3</sup> /1000 strokes	rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	mm mm
1	3	3	4	5	6	7	8	9
LDA 700	0,75 bar 175,0-178,0 (172,0-181,0)		LDA 700	0 bar 155,0-159,0 (152,0-162,0		240,0-280,0 =RW 20,0- 21,0 mm	ı	•

Checking values in brackets

\* 1 mm less control rod travel then col. 2

#### D. Adjustment Test for Manifold Pressure Compensator

Test at n = rev/min decreasing pressure - in bar gauge pressure 500

VOL 12,0 f 3

500			
Pump/governor	Setting  Gauge pressure =	Measurement bar Gauge pressure =	Control rod travel- difference mm (1)
PE 6 PRS 3071 Y +RQVPA 371	0,29	0,75 0 0,24	9,9-10,0 10,2-10,3 9,2-9,3 9,5-9,7

Notes:

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

Testoil-ISO 4113

# Test Specifications Fuel Injection Pumps 2 and Governors

40

WPP 001/4 DAF 11,6 i 8
2. Edition

En

PE 6 P 110 A 320 RS 372-1 Komb.-Nr. 0 401 846 463 RQ 250/1100 PA 417-1 RQ 250/1100 PA 417 supersedes 1.82 company:DAF

engine: DKTD 1160

191 kW (260 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

2,8-2,9 (2,75-2,95)

mm (from BDC)

		(2,70 2,507				
Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
850	11,9+0,1	13,5-13,7	0,4(0,8)			
250	6,6-6,8	0,7-1,1	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checkin PRG che	g of slider	Full-load s Setting po	*	•	cifications (4)	ldle spec	_		cifications (5)	Torque o	control 3
rev/min	Control rod travel mm	rev/min 3	Control red travel rnim 4	Central real travel mm 5	rev/min	rev/min 7	Control red travel stretti 8	rev/min 9	Control rod travel	rev/min	Control rod travel mm
700	15, -16,4	700	16,0	11,0 4,0 1350			6,7	250	min.7,8 6,6-6,8 500 = 2,0		12,0-12,1 11,9-12,1

Torque-control travel on flyweight assembly gimension a =

mm

1145-1160 min-1

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	elivery on control lever np. 40°C (104°F)	Control rod stop 3a	Fuel deliv	ery characteristics 36	Starting fi Idle spee	uel delivery
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm³/-1000 strokes	rev/min 6	cm <sup>3</sup> /1000 strokes / mm
LDA 850	0,7 bar 134,5-136,5 (132,0-139,0)	-	LDA 600	0 bar 125,0-128,0 (122,0-131,0)	100	245,0-285,0 = 19,5-21,0 mm RW

Checking values in brackets

3.83

BOSCH

### D. Adjustment Test for Manifold Pressure Compensator

Test at n =

600

rev/min decreasing pressure - in bar gauge pressure

DAF 11,6 i 8 - 2 -

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure =	bar Gauge pressure =	bar mm (1)
PE6PRS372-1	0,30		11,8 - 11,9
+PA417-1		0,70	1 1,9 - 12,0
or •PA 417		C	11,3 - 11,4
		0,26	11,5 - 11,7

Notes.

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

# Test Specifications Fuel Injection Pumps (A) and Governors

WPP 001/4 IHC 13,4

1. Edition

E١

PES 6 P 110 A 420 LS 3043

RSV 350-1100 PO/431 DR

supersedes IHC company DTI 817 C

Komb.-Nr. 0 402 076 712

engine: 309 kW (420 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

2,0-2,1 Port closing at prestroke (1,95-2,15)

Testoil-ISO 4113

mm (from BDC)

Rotational speed	Control rad	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm 2	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> / 100 strokes	IT:M	cm <sup>3</sup> /100 strokes	mm 6
1100	15,4+0,1	25, 8-26,0	0,8		3	
300	5,6-5,8	0,7-1,2	0,4			
300	0,0.0,0	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				

Adjust the fuel delivery from each outlet according to the values in [

#### **B. Governor Settings**

1 Uppe	rated speed	rev/min	Intermed	diate rated	speed	(4)	Lower	rated speed	(3) To	rque control
Degree of deflection of control lever 1	Control rod travel mm	Control rod travel mm rev/min	4	5	6	Control- lever deflection in degrees 7	rev/min 8	Control rod travel mm	rev/min	Control rod travel mm
loose	800	0,3-1,0	-	•	-	ca. 20	100	5,5		0,9-1,1
ca. 44	1100 1200 1280	15,6-16,2 6,0-9,2 1,3-2,0					350 410	5,4-5,6 1,3-2,0		0,9-1,1

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

(20)	ill-load stop emp_40°C (104°F)	Rotational- speed limital (3a) Fuel delivery characteristics			Starting f	uel delivery 5	I Control rod	
rev/min	cm <sup>3</sup> /1000 strokes	changed to ) rev/min 3	rev/min	cm <sup>3</sup> /1000 strokes 5	rev/min	cm <sup>2</sup> /1000 strokes 7	rev/min 8	travel mm 9
LDA 1100	1,2 bar 257,5-259,5 (254,5-262,5)		LDA 700	1,2 bar 284,5-288,5 (281,5-291,5)	100	255,0-29	5,0	
			LDA	0 bar 151,5-155,5 (148,5-158,5				

Checking values in brackets

\* 1 mm less control rod travel than col. 2

BOSCH

### D. Adjustment Test for Manifold Pressure Compensator

IHC 13,4 d - 2 -

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

Pump/governar	Setting  Gauge pressure = bar	Measurement  Gauge pressure = bar	diminution Control rod travel- difference mm (1)
PES 6 P LS 3043 + RSVPO/431 DR		0,80-0,93	Start End
	ć		

Notes

(1) when n =

rev/min and gauge pressure =

bar ( = maximum full-load control rod travel)

## **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 MB 21,9 b 1 1. Edition

PE 12 P 120 A 320 LS 3819-2 ROV 350-1050 PA 493

1-5 -9 - 8 - 3 - 4 -11-10 - 2 - 6 - 7 - 12 0-15-60-75-120-135-180-195-240-255-300-315° ±0,5° (±0,75°) engine: 357 kW (485 PS)

Values apply to

engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1 680 750 067
All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers Company Daimler-Benz

Komb.-Nr. 0 401 840 711

# A. Fuel Injection Pump Settings

mm (from BDC) Zv1. 12 Port closing at prestroke (3.95-4.15)

Rotal			Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
10	50	10,2+0,	1 15,1-15,3	0,5(0,8)			
3	50	4,6-4,	8 1,2-1,8	0,8(1,2)			
l				!			

Adjust the fuel delivery from each outlet according to the values in [

#### **B.** Governor Settings

Testoil-ISO 4113

Upper rated s	peed		Intermediate	rated sp	eed		Lower rated	speed	1	Sliding s	leeve travel
deflection	rev/min Control rod travel	Control rod ta	Degree of deflection of control		Control rod travel		Degree of deflection of control		Control rod travel	) rev/min	1 mm
	mm 2	rev/min (2a	) lever 4	rev/min 5	mm 6	•	lever 7	rev/min 8	mm (3	10	11
max.	1150	15,2-17,8	-	-	-		ca.10	100 350	min.6,2 4,6-4,8		0,9-1,1 3,4-3,6
ca. 56	9,2 4.0	1080-1090 1175-1205						330	1 4,0 4,0		4,7-4,9 6,8
	1350	0 - 1,0					360-500				
							3				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-roo Test oil ten		Rotational-speed (2b) limitation intermediate speed	Fuel deliv high idle s	ery characteristics (50)	Starting Idle switchin		Torque- travel	Control 5  Control rod
rev/min	crh³/1000 stroket	rev/min 4a	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min 8	mm 9
LDA 1050	0,6 bar 151,0-153,0 (148,0-156,0)	1080-1090*	LDA 1050 ** LDA 500	0,6 bar 120,0-123,0 (117,0-126,0 0 bar 124,0-126,0		130,0-150,0	-	•

Checking values in brackets

Set at the reduced-delivery stop.

\* 1 mm less control rod travel than col 2

BOSCH

### D. Adjustment Test for Manifold Pressure Compensator

MB 21,9 b 1 - 2 -

Test at n =

500

rev/min decreasing pressure – in bar gauge pressure increasing

Pump/gavernor	Setting  Gauge pressure = bar	Measurement  Gauge pressure = bar	diminution Control rod travel- difference mm (1)
	Gadda biezzdie – pm	daugs pressure	(1)
PE 12 PLS3819-2 +ROVPA 493	0,28	0,60	9,9-10,0 10,2-10,3 9,4-9,5
		0,24	9,6-9,8

Notes:

(1) when n =

rev/min and gauge pressure = bar (= maximum full-load control rod travel)

WPP 001/4 KHD 1 g 3 3. Edition

PES 4 A 85 D 410/3 RS 2638

Komb.-Nr. 0 400 864 054

RSV 325-1150 A 8 B 2168 Lcompany: KHD

supersedes1.82

BF 4 L 913 T 66 kW (90 PS)\_1

2300 min

DX 92 (1) Tractor

60 kW (82 PS)

2300 min DX 86 (2)

Tractor

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Testoil-ISO 4113

mm (from BDC)

Rotational speed rev/min		Fuel delivery (1) cm <sup>3</sup> /100 strokes	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery (2) cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
1150	11,8+0,1	8,2 - 8,3	0,3(0,45	10,6+0,	1 7,5-7,6	
325	7,7-7,9	1,0 - 1,6	0,2(0,4)	7,7-7,9	1,0-1,6	

Adjust the fuel delivery from each outlet according to the values in [

#### **B.** Governor Settings

Upper	Upper rated speed			rated spe	ed	4 Lower rated speed			3 Torque control		
Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	Control rod travel mm	
1	2	3	4	5	6	7	8	9	10	11	
loose	800	0,3-1,0	-	-	•	ca. 26	325	7,3	1150	11,8+0,	
10036	X = 4	,0					100 325	min. 19, 7,7-7,9	0 500 965	11,3+0, 12,0+0,	
ca.54	10,8 4,0 1495	1190-1200 1325-1355 0,3-1,7					720-7	80 = 2,0			

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

2 Full-loa	ad stop	6 Rotational- speed limitat.	3a Fuel delivery Starting fuel delivery Idle			5a idle stop		
Test oil temp. 40°C (104°F)  rev/min cm³/1000 strokes 1 2		Note: changed to rev/min 3	rev/min	r cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm
1150	82,0-83,0 (80,0-85,0)	1190-1200*	800	74,5-77,5 (72,5-79,5)	100	108,5-118,5 = RW 17,3 - 17,9 mm	-	-

Checking values in brackets

\* 1 mm less control rod travel than col 2

#### **B.** Governor Settings

(1) Uppe	Intermediate rated speed			<b>(•)</b>	· Lower	Torque control				
deflection	Control rodi	Control rod travel mm rev/min				Control- lever deflection				travel mm
of control lever	mm 2	3	4	5	6	in degrees 7	8	9	10	11
loose	800	0,3-1,0	-	-	-	ca.26	325	7,0	1150	10,5+0,1
٠.	х =	4,0					100	min.19,0	500	11,2+0,1
ca.56	9,6	1220-1230				1	325	7,4-7,6	900	10,9+0.3
22	4.0 1475	1325-1355 0,3-1,7					720-780	= 2,0		

# C. Settings for Fuel Injection Pump with Fitted Governor

Full-load stop Test oil temp. 40°C (104°F)		Rotational- speed limitat.		el delivery aracteristics	Starting f	uel delivery 5	(4a) Idle stop Control roo	
1	cm <sup>3</sup> /1000 strokes 2	changed to) rev/min 3	I dividing a survivor		rev/min 6	cm³/1000 strokes 7		mm 9
(2) 1150	74,5-75,5 (72,5-77,5)	1220-1230*	800	65,5-68,5 (63,5-70,5)	100	108,5-118,	5 -	-

Checking values in brackets

# Testoil-ISO 4113

1 mm less control rod travel than col. 2

#### **B.** Governor Settings

1 8 1 /	rated speed Control rod travel mm	Intermed	diate rated	speed 6	Control- lever deflection in degrees 7	rated speed  Control rod travel  mm	rque control Control rod travel mm
22						·	

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load stop Test oil temp. 40°C (104°F) rev/min   cm³/1000 strokes	6 Rotational- speed limitat. Note: changed to) rev/min 3	rev/min	aracteristics cm²/1000 strokes 5	rev/min 6	cm-/1000 strokes	Control rod travel mm
	`					
						·

Checking values in brackets

\* 1 mm less control rod travel than col. 2

WPP 001/4 KHD 6,1 a 1 3. Edition

En

PES 6 A 85 D 410/3 RS 2415

RS 325/1325 AOB 691 DL 709 DL

supersedes . 82 company: KHD

Test RS governor according to WPP 001/4 KHD 1 c.

engine: BF6 L 913 110 kW (150 PS) 2650 min

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

### A. Fuel Injection Pump Settings

Port closing at prestroke (1,85-2,05) mm (from BDC

	- 11	,85-2,05)				
Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> / 100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
1325	12,0+0,1	8,7 - 8,8	0,3(0,45)			
325	2,2-8,4	1,4 - 2,0	0,2(0,4)			
				İ		
				<u> </u>	<u> </u>	

Adjust the fuel delivery from each outlet according to the values in

### **B.** Governor Settings

Upper	rated speed		Intermediate	rated spe	ed	4 Lowe	rated spe	ed	3 Tor	que control
Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel		Control rod travel
lever	rev/min	mm	lever	rev/min	mm	lever	rev/min	uu	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
loose	800	0,3-1,0	-	-	•		325	6,5		12,0+0,1 12,5+0,2
	X =	7,0	ļ				100 325	min.16,0 6,4-6,6		12,1+0,2
68.68	11,0	1355-1365 1450-1480	•				500	3,4-4,0 370=2,0		
	4,0 1600	0,3-1,7					1330-	370-2,0		

The numbers denote the sequence of the tests

### C. Settings for Fuel Injection Pump with Fitted Governor

2 Full-load stop		6 Rotational- speed limitat.			Starting Idle	fuel delivery	5a Idle stop	
Test oil ten rev/min 1	np. 40°C (104°F) cm³/1000 strokes 2	Note: changed to rev/min 3	rev/min	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm
LDA 1325	0,7 bar 86,5-87,5 (84,5-89,5)	1355-1365*	LDA 500 LDA 800	0 bar 56,0-58,0 (53,5-60,5) 0,7 bar 76,5-78,5 (74,0-81,0)	100	15,0-16,0 mm RW	-	-

Checking values in brackets

\* 1 mm less control rod travel than col 2

D. Adjustment Test for Manifold Pressure Compensator

KHD 6,1 a 1 - 2 -

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PES 6 ARS 2415	0,27		11,6 - 11,8
+AOB 691 DL +AOB 709 DL		0,70	12,5 - 12,7
		0,37	12,2 - 12,3
		0	11, 3 - 11,5

Notes:

(1) when n =

rev/min and gauge pressure =

bar ( = maximum full-load control rod travel)

WPP 001/4 KHD 4.7 c

2. Edition

PES 5 A 80 D 410/3 RS 2603

RS 325/1650 A 0 B 2087 L

superserie 10.82

company: KHD

engine: F 5 L 912 63 kW (85 PS) 3000 min

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

### A. Fuel Injection Pump Settings

Port closing at prestroke

mm (from BDC)

Rotational speed	Control rod travel	Fuel delivery	Difference cm <sup>3</sup> /	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
res/win	LUU.	cm <sup>3</sup> /100 strokes	100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1 %	2	3	4	2	3	6
1500	9,9-10,0	5,1 - 5,2	0,2(0,35			
325	8,7-8,9	1,7 - 2,1	0,2(0,3)			
		ļ				
	1					
			1	1	ĺ	

Adjust the fuel delivery from each outlet according to the values in [

### **B.** Governor Settings

Upper	Upper rated speed			Intermediate rated speed			4 Lower rated speed			3 Torque control	
Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	Control rod travel mm	
1	2	3	4	5	6	7	8	9	10	11	
loose	800	0,3-1,0	-	-	-	VH max	325	8,8	-	-	
						FHca.18	100 325	min.13,6 8,7-8,9			
VH ca.49	8,9 4,0 1900	1690-1700 1740-1770 0 - 1,0	1				550- 600				

The numbers denote the sequence of the tests

### C. Settings for Fuel Injection Pump with Fitted Governor

2 Full-to	ed stop	6 Rotational- speed limitat.				fuel delivery	5a idi	stop
Test oil temp rev/min 1	cm <sup>3</sup> /1000 strokes	Note: changed to rav/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	r <del>ev</del> /min 8	Control rod travel mm 9
1500	50,5-51,5 (49,0-53,0)	1690-1700*	-	-	-	-	-	•

Checking values in brackets

\* 1 mm less control rod travel than col. 2

3.33

WpP 001/4 MB 18,3 e 2. Edition

En

PE 10 P 120 A 320 LS 3824 RQ 300/1050 PA 656
1-8-7-6-3-5-2-10-9-4
0-27-72-99-144-171-216-243-288-315° ± 0,5° (± 0,75°)
Values apply to

engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1 680 750 067

supersedes 10.82 company: Daimler-Benz

om 423 LA engine: 0M 423 LA 346 kW (470 PS)

Euclid Komb.-Nr. 0 401 849 707

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

Testoil-ISO 4113

4,0 - 4,1 (3,95-4,15)

mm (from BDQJy1. 10

		(0,00-,,0)		J		
Rotational speed rev/min	Control rod travel mm 2	Fuel delivery  cm³/100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm³/100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1050	11,3+0,1	17,7-17,9	0,5 (0,8)			
300	5,0-5,2	1,6-2,2	0,8 (1,2)			
				:		

Adjust the fuel delivery from each outlet according to the values in

### **B.** Governor Settings

Checking PRG chec		Full-load : Setting po	•	•	cifications (4)	Idle spec	•		cifications (5)	Torque o	control 3
	Control rodi	rav/min 3	Central red traval rmm	Control	rev/min 6	rev/min 7	Control red travel rnm		Control rod	rev/min	Control rod travel mm
600 VH =	19,2-20,8 max. 46°	600	20,0	10,3 4,0 1300	1095-1110 1165-1195 0-1,0		4,3	300	min. 5,8 4,2-4,4 375 = 2,0	•	-
	ontroi trevel				L		10	95-11	0 min-1		1 mm less contr

Torque-control travel
on flyweight assembly dimension a =

n Speed regulation: At

1 mm less control rod travel

### C. Settings for Fuel Injection Pump with Fitted Governor

governor	ull-load delivery on overnor control lever est oil temp 40°C (104°F)		Control rod stop	Fuel deliv	Fuel delivery characteristics			uel delivery	
rev/min 1	cm <sup>3</sup> /-1000 strokes 2		rev/min 3	rev/min	cm <sup>3</sup> /~1000 strokes 5		rev/min	cm <sup>3</sup> /1000 strokes/mm	
LDA 1050	0,9 bar 177,0-179,0 (174,0-182,0)		•	LDA 600 LDA 500	0,9 bar 173,0-179,0 (170,0-182,0) 0 bar 141,0-143,0 (138,0-146,0)		100	150,0-170,0	

Checking values in brackets

3.83

**BÒSCH** 

### D. Adjustment Test for Manifold Pressure Compensator

MB 18,3 e

-2-

Test at n =

500

rev/min increasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 10 PLS 3824	0,90		11,3 - 11,4
+ RQPA 656		0	10,2 - 10,4
		0,41	10,9 - 11,1
		0,35	10,5 - 10,6
		·	

Notes

(1) when n =

rev/min and gauge pressure = bar (= maximum full-load control rod travel)

## **Test Specifications** Fuel Injection Pumps 2 and Governors

WPP 001/4 MB 11,4 i

Edition

PES 6 P 120 A 820 LS 3077

RQ 300/1100 PA 585

superceded 1.81 company: Daimler-Benz OM 407 LA

Values apply to engine nozzle-and-holder assemblies 1 688 901 019 1 680 750 067 and engine fuel-injection tubing

235 kW (320 PS)

Komb.-Nr. 0 402 046 722

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke

estoil-ISO 411

(3,95-4,15)

mm (from BDQV) 6

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery  cm³/100 strokes 3	Difference cm <sup>3</sup> / 100 strokes	Control rod travei mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	13,4+0,1	21,2 - 21,4	0,5 (0,9)			
300	5,5-5,7	1,4 - 2,0	0,8 (1,2)	İ		

Adjust the fuel delivery from each outlet according to the values in .....

### **B.** Governor Settings

Checkin PRG che	g of slider ck (1)	Full-load s Setting po	•	•	cifications (4)	idle spec Setting p			cifications (5)	Torque o	(3)
rev/min 1	Control rod travel mm 2	rev/min 3	Control red travel mm	Control red travel rnm 5	rev/min 6	rev/min 7	Control rad travel rnm &	rev/min 9	Control rod travel mm	rev/min 11	Control rod travel mm
650	19,2-20,8	650	20,0	12,4 4,0	1145-1160 1 <b>200-</b> 12 <b>3</b> 0	300		300	min.6,5 4,8-5,0 10=2,0 mm		-
							L_,	145-1	60 min 1	<u> </u>	

Torque-control travel on flyweight assembly dimension a =

Speed regulation: At

1 mm less control rod travel

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of governor of Test oil ter	delivery on control lever mp 40°C (104°F)	Control rod stop 3a	Fuel deliv	ery characteristics 30	Starting fi ldle spee	Control
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min	cm³/-1000 strokes 5	revimn 6	red travel cm <sup>3</sup> /1000 strokes / mm 7
LDA 1100	0,70 bar 212,0 - 214,0 (209,0 - 217,0)		LDA 600 LDA 500	0,70 bar 205,0 - 211,0 (202,0 - 214,0) 0 bar 146,0 - 148,0 (143,0 - 151,0)	100	170,0 - 190,0

Checking values in brackets

3.83

## D. Adjustment Test for Manifold Pressure Compensator

MB 11,4 i -2-

Testat n =

decreasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 6 P LS 3077 + PA 585	0,70	0 0,42 0,31	13,4-13,5 10,7-10,8 12,6-12,7 11,4-11,5

Notes

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

WPP 001/4 MAN 11,1 1 4 3. Edition

PES 6 P 110 A 720 LS 360

RO 250/1100 PA 335 DR

supersedes 1.79 (1) company: MAN

ROV 250-1050 PA 373 DR

D 2566 MTUH

6 - 2 - 4 - 1 - 5 - 3 0 -60 -120-180-240-300°

(1 - 206 kW - 280 PS Nr. 7059) (2 - 202 kW - 275 PS Nr. 7999)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke

(2,95-3,15)

mm (from BDC RW 9,0 - 12,0 mm; Zyl. 6

(2)

Rotational speed rev/min 1	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	12,1+0,	14,6 - 14,8	0,4(0,8)	12,0+0,1	14,9 - 15,1	n = 1050
250	6,8-7,0	1,1 - 1,7	0,4(0,7)	6,8-7,0	1,1 - 1,7	
700/500		С	0,6(1,0)			

Adjust the fuel delivery from each outlet according to the values in

### **B.** Governor Settings

RQ.. 335 DR (1)

	Checking of slider FRG check  Setting point		•	•	cifications (4)	Setting point   Test specifications (5)						
rev/min	Control rod travel mm		Control red travel rnm 4	Central red travel rnm 5	rev/min 6	rev/min 7	Control red travel rnm 8	rev/min 9	Control rod travel mm	rev/min	Control rod travel mm	
600	19,2-20,8	600	20,0	11,1	1145-1160 1200-1230	1	6,9	100 250	min. 8,5		12,1-12,2 12,3-12,5	
VH =	max. 46°			1350	0 - 1,0			I	410 =2,0	800	12,6-12,8 12,8-12,9	

Torque-control travel

0,3

1 mm less control rod travel

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de governor co Test out term	(0)	Control rod stop 3a	Fuel delive	(ЗЬ)	Starting fuel delivery Idle speed		
rev/min	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min	cm <sup>3</sup> /-1000 strokes 5		-over point Control and travel cm <sup>3</sup> /1000 strokes / mm 7	
(1) 1100	LDA 0,7 bar 146,0-148,0) (143,5-150,5)		LDA 500	0,2 bar 123,0 - 127,0 (120,0 - 130,0)	100	215,0 - 235,0	
700	157,0-161,0 (154,0-164,0)		LDA 500	0 bar 111,0 - 113,0 (108,0 - 116,0)	100-	170 (80-190)	

Checking values in brackets

2.83

0

Upper rated	speed			Intermediate	rated spe	ed	Lower rated	speed		Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	(1a) (2a)	Degree of deflection of control lever	rev/min	travel	Degree of deflection of control lever 7	rev/min	Control rod travel mm 3	rev/min	mm 11
max.		15,2-17	,8	-	-	-	ca.16		min.8,5 6,8-7,0 580 =2,0	800	0,9-1,1 5,3-5,5
ca.66		1090-11 1205-12 0 - 1,	35				33			1150	8,3

Torque control travel a =

mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-ros Test oil ten		Rotational-speed 2b limitation intermediate speed	character high idle s	istics	Starting Idle switchin	fuel delivery 6	Torque-d travel	Control cod
rev/min	cm³/1000 strokes	rev/min (4a)	rev/min	cm <sup>3</sup> /1 <b>000</b> strokes 5	rev/min	cm <sup>2</sup> /1000 strokes 7	rev/min 8	mm 9
(2) 1050	LDA 0,7 bar 148,5-150,5 (146,0-153,0		LDA 500	0,2 bar 123,0-127,0 (120,0-130,0)		215,0-2 5,0		12,0+0, 12,2+0,
700	153,0-157,0 (150,0-160,0	I .	LDA 500	0 bar 111,0-113,0 (108,0-116,0)		-170 (80-190)		12,6+0,

Checking values in brackets

\* 1 mm less control rod travel than col. 2

## Testoil-ISO 4113

### D. Adjustment Test for Manifold Pressure Compensator

Testat n =

rev/min increasing pressure - in bar gauge pressure

Pun	np/governor	Setting		Control rod travel: 如果我們 XXXX規模可來nce
L		Gauge pressure = bar	Gauge pressure = bar	mm
36	0 + 335 DR	0,70	0,32 0,20 0	12,8 - 12,9 12,2 - 12,4 11,5 - 11,6 10,9 - 11,0
36	0 + 373 DR	0,70	0,32 0,20 0	12,6 - 12,7 12,2 - 12,4 11,4 - 11,5 10,9 - 11,0

En

## **Test Specifications** Fuel injection Pumps (2) and Governors

WPP 001/4 DAF 8.3 k 2

1. Edition

PE 6 A 95 D 410 RS 2525

RO 225/1200 AB 1156 L

Specifications apply to test tubing 1 680 750 015

supersectes companDAF engine: DH 825

Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

(1.95-2.15)

		(-,				
Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1200 225	10,4+0, 5,7-5,		0,35(0,6) 0,35(0,5			

Adjust the fuel delivery from each outlet according to the values in

### **B.** Governor Settings

Checking PRG che		Full-load : Setting po	oint	Test spec	cifications (4)	Idle spec	point		cifications 5	Torque d	(3
rav/min 1	Control red travel mm	rev/min 3	Control red travel mm 4	Central real travel rnm 5	rev/min 6	rev/min 7	red travel mm	rev/min 9	travel mm	rev/min 11	Control rod travel mm 12
650 VH=	19,2-20,8 max. 46°	650	20,0	_	1245-1260 1300-1330 0-1,0	225	6,1	225 345-	min. 7,5 6,0-6,2 385=2,0 max. 1,0	650 1035	10,4-10,5 11,1-11,2 10,7-10,9 10,5-10,8
•	antral travel		0.2	5			1	245-12	60 min 1		1 mm less contr

Speed regulation: At

rod travel

### C. Settings for Fuel Injection Pump with Fitted Governor

	elivery on ontrol lever np. 40°C (104°F)	Control rod stop 3a	Fuel deliv	ery characteristics	ノコレン	Starting fi	el delivery	
rev/min	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rav/min 4	cm <sup>3</sup> /-1000 strokes 5		rev/min	cm <sup>3</sup> /1000 strokes / mm	
1200	73,0-75,0 (71,0-77,0)		800	74,5-77,5 (72,0-80,0		100	121,5-131,5 = 19,5-21,0 mm RW	

Checking values in brackets

## **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 KHD 6,1 K 2

2. Edition

PES 6 A 85 D 410 RS 2592

ROV 300-1250 AB 1158 L

Komb.-Nr. 0 400 846 497

supersede9.82 company: KHD BF 6 L 913 GMC vehicle 118 kW (160 PS) 2500 min-1

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

### A. Fuel Injection Pump Settings

Port closing at pres	troke (2.	15-2,3 15-2,35)	mm (from BDC)	9,0-	12,0 mm RW	
Rotational speed		Fuel delivery	Difference cm <sup>3</sup> /	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min 1	mm 2	cm <sup>3</sup> /100 strokes 3	100 strokes	mm 2	cm³/100 strokes 3	mm 6
1250	12,5+0,1	8,4-8,5	0,3 (0,45			
300	8,3-8,5	1,0-1,6	0,2(0,4)			
			1			

Adjust the fuel delivery from each outlet according to the values in [

### **B.** Governor Settings

Testoil-ISO 4113

Upper rated s	peed		Intermediate	rated sp	eed	Lower rated	speed		Slicting s	lseve travel
deflection of control	rev/min Control rod travel	Control rod travel	Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel		0
lever 1	mm 2	revirme (2a)	lever 4	rev/min 5	mm (4)	lever 7	rev/min 8	mm (3)	rev/min 10	11
max.	1290	15,2-17,8	-	-	•	ca.17		min.10,2 3,3-8,5		0,5-0,8 3,6-3,7
ca. 66		1290-1300 1375-1405 0 - 1,0				450-575		,0,0-0,0		5,3-5,4 8,1
						<b>3</b>				

Torque control travel a =

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ter	d stop np. 40°C (104°F) 2	limitation	high idle s	(3)	Starting Idle awitchir		Torque- travel	Control rod
rev/min	cfh³/1000 strokes .	rev/min 4e	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	mm
1	2	3	4	5	6	7	8	9
LDA	0,7 bar	1290-1300*	LDA 800	0,7 bar 80,5-82,5	100	102,0-112,0	500	
1250	83,5-84,5 (81,5-86,5)			(78,0-85,0)		21,0 mm RW	1000	13,2+0, 12,9+0, 12,7+0,
			LDA	0 bar			1100	12,,,,,,,
			500	59,0-6 1,0 (56,5-63,5)				

Checking values in brackets

\* 1 mm less control rod travel than col 2

3.83

## D. Adjustment Test for Manifold Pressure Compensator

KHD 6,1 k 2 - 2 -

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure ≈ bar	Gauge pressure = bar	mm (1) .
PES 6 A. RS 2592	0,70		13,2 - 13,3
+ RQVAB 1158 L		0	11,8 - 11,9
		0,48	12,8 - 12,9
		0,33	11,9 - 12,1
,			

Notes.

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

WPP 001/4 STE 4,0a 3

2. Edition

VA 4/90 H 1200 CR 164 0 460 394 010

supersede.82 company Steyr engine WD 408.40

Nozzle-and-holder assembly 1 688 901 020 (172 + 3 bar)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers Test Intructions and Test Equipment

**VDT-WPP 161/4 B** 

Pre-setting see reverse side

Pre-stroke setting

Testoil-ISO 4113

 $0.3 \text{ mm} \pm 0.02 (\pm 0.04)$ 

1. Settings	rev/min	Settings		Charge-air press kp/cm²	Difference in delivery cm <sup>3</sup>
1 1 Timing device travel	900	2,2-3,0	mm		
1.2 Supply pump pressure	900	4, 8-5, 3	kp/cm²		
1.3 Full-load delivery without charge-air pressure	1200	62,0-63,0	cm <sup>3</sup> /1000 strokes		2,5
Full-load delivery with charge-air pressure			cm³/1000 strokes		
1.4 Idle speed regulation	300	10,0-16,0	cm <sup>3</sup> /1000 strokes	1	3,0
1 5 Start (autom.)	100	mind. 75, 0	cm <sup>3</sup> /1000 strokes		
1.6 Full-load speed regulation	1280	31,0-39,0	cm <sup>3</sup> /1000 strokes		

2. Test Sp	ecificat	IONS Checlung values in brackets		
2.1 Timing device	rev/min	590-700(560-730)	900	920-1050
	mm	Start	(1,9-3,3)	2,9-3,6(2,6-3,9)
2.2 Supply pump	rev/min	200	900	1200
	kp/cm²	1,5-2,0(1,3-2,2)	(4,6-5,5)	5,6-6,1(5,4-6,3)
Overflow delivery	rev/man	500		1200
	cm <sup>3</sup> /10 s	55-100(40-110)		55-100(40-110)

2	2	E. and	deliveries
4	3	ruer	OCHIVET ICS

Speed control lever	Dalivery lever	rev/min	cm <sup>3</sup> /1000 strokes		Charge-air pressure kp/cm²
End stop	Full	1330-1400 (1310-1420) 1280	0	(30,0-40,0)	
		1200 900	60 0-62 0	(61,5-63,5) (59,0-63,0)	
		500		(55,0-61,0)	
	Stop	1200	0		
idle stop	Full	400-470 (380-490)	0		
		300		(9,0-17,0)	
	Start	100	mind. 75,0		
End stop				•	

Pump  a = 25 ± 4°  b = 45 ± 8°  Pump  Dimension IV 3,5 mm  Dimension V 24,6 mm	Angle to the stop-plate	Pre-setting dimensions
$v = 30 - 8^{\circ}$ $\delta = 60 + 8^{\circ}$	$a = 25 \pm 4^{\circ}$ $b = 45 \pm 8^{\circ}$ $b = 30 - 8^{\circ}$	Dimension IV 3,5 mm

# Test Specifications Distributor-Type Fuel Injection Pump

WPP 001/4 IHC 5, 8 q 5

2. Edition

VA 3/10 H 1200 CR 409 CR 409 P

0 460 303 156

Testoil-ISO 4113

supersedes

IHC

company D 159/53 HP

engine

Nozzle-and-holder assembly 1 688 901 020 (172 + 3 bar)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers Test Intructions and Test Equipment

VDT-WPP 161/4 B

Pre-setting see reverse side

Setting of the pointer at a stroke of 1 mm in relation to outlet "A".

1. Settings	rev/min	Settings		Charge-air press kp/cm	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1000	4,8-5,8	mm		
1.2 Supply pump pressure	1000	5,6-6,1	kp/cm <sup>2</sup>		
1.3 Full-load delivery without	800	72,5-73,5	cm <sup>1</sup> /1000 strokes		2,5
charge-air pressure Full-load delivery with charge-air			cm <sup>3</sup> /1000 strokes		
pressure  1.4 idle speed regulation	375	12,0-18,0	cm <sup>3</sup> /1000 strokes	•	3,0
1 5 Start	100	mind. 90,0	cm <sup>3</sup> /1000 strokes		
1 6 Full-load speed regulation	1300	26,0-34,0	cm <sup>-</sup> /1000 strokes		

2. Test Sp	ecification	ONS Checking	values in brackets 600	1000	1200
2.1 Tirming device	nm nm	Start 200	1,0-2,0 (0,7-2,3)		6,1-6,8 (5,8-7,1) 1200
2.2 Supply pump	rev/min kp/cm²		(1,5-2,4)	(5,4-6,3)	6,3-6,8 (6,1-7,0)
Overflow delivery	rev/min cm <sup>3</sup> /10 s	50 55-100	0 (40-110)		1200 55-100 (40-110)

	cm <sup>3</sup> /10 s	55-100 (40-	-110)		55-100 (40-110)
23 Fuel deliveries					
Speed control lever	Delivery lever	rev/min	cm <sup>3</sup> /1000 strokes		Charge-air pressure kp/cm <sup>2</sup>
End stop	Full	1340-1400 (1320-1420) 1300 1180 800 500	0 76,5-79,5 70,0-74,0	(25,0-35,0) (75,5-80,5) (72,0-74,0) (69,0-75,0)	
	Stop	1200	0		
idle stop	Full	420-470 (400-490) 375	0	(11,0-19,0)	
	Start	100	mind. 90,0	•	

Angle to the stop-plate	Pre-setting dimensions
Pump c 25 ± 4° 8 50 ± 8° Y 30 - 8° 60 + 8°	Pump Dimension IV — MM Dimension V 24,65 mm

WPP 001/4 IHC 5,8 q 4 2. Edition

n

VA 6/10 H 1200 CR 408 CR 408 P 0 460 306 250

Testoil-ISO 4113

supersedes company

engine

Nozzle-and-holder assembly 1 688 901 020 (172 + 3 bar)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

Test Intructions and Test Equipment VDT-WPP 161/4 B

8.81

IHC

D 358

VDT-WPP 161/4 B
Pre-setting see reverse side

Pre-stroke setting 0,3 mm
Setting of the pointer at a stroke of 1 mm in

elation to outlet A.					
1. Settings	rev/min	Settings		Charge-air press kp/cm²	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1000	4,1-4,9 mm	mm		
1.2 Supply pump pressure	1000	5,7-6,2	kp/cm²		
1.3 Full-load delivery without charge-air pressure	800	66,5-67,5	cm <sup>3</sup> /1000 strokes		2,5
Full-load delivery with charge-air pressure			cm <sup>3</sup> /1000 strokes		
1.4 Idle speed regulation	350	12,0-18,0	cm <sup>3</sup> /1000 strokes		3,0
15 Start	100	mind. 90,0	cm <sup>3</sup> /1000 strokes		
1 6 Full-load speed regulation	1280	28,0-36,0	cm <sup>3</sup> /1000 strokes		

2. Test Sp	ecificatio	Checking values in brackets	1000	1200
2.1 Timing device	rev/min	1,3-2,3 (1,1-2,5)	(3,8-5,2)	5,2-5,9 (4,9-6,2)
22 Supply pump	rev/min kp/cm²	200 1,7-2,2 (1,4-2,5)	1000 (5,5-6,4)	1200 6,4-6,9 (6,2-7,1)
Overflow delivery	rev/min cm³/10 s	500 55-100 (40-11 <del>0</del> )		1200 55-100 (40-110)
23 Fuel deliveries				
Speed control lever	Delivery lever	rev/min cm³/1000 stro	kes	Charge-air pressure kp/cm²

Speed control lever	Delivery lever	rev/min	cm <sup>3</sup> /1000 strokes		Charge-air pressure kp/cm²
End stop	Full	1320.1380 (1300-1400)	0		•
		1280 1150 800 500	68,0-71,0 59,5-63,5	(27,0-37,0) (67,0-72,0) (66,0-68,0) (58,5-64,5)	
	Stop	1200	0		
idle stop	Full	500-550 (480-570)	0		
		350		(11,0-19,0)	
	Start	100	mind. 90,0		

Angle to the stop-plate	Pre-setting dimensions
Pump 25 ± 4° 8 51 ± 8° 7 30 - 8° 5 60 + 8°	Pump Dimension IV = - mm Dimension V = 24,65 mm

## **Test Specifications** Distributor-Type Fuel Injection Pump

WWP 001/4 IHC 5,8 q 8 1. Edition

VA 6/10 H 1150 CR 87-3 0 460 306 260

Testoil-ISO 4113

supersedes IHC companyD 358

Nozzle-and-holder assembly 1 688 901 020 (172 + 3 bar)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers Test Intructions and Test Equipment **VDT-WPP 161/4 B** 

Pre-stroke setting 0.4 mm Setting of the pointer at a stroke of 1 mm in Pre-setting see reverse side

relation to outlet A.					
1. Settings	rev/min	Settings		Charge-air press kp/cm²	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	700	2,4-3,2	mm		
1.2 Supply pump pressure	700	4,9-5,4	kp/cm²		
1.3 Full-load delivery without charge-air pressure	700	69,5-70,5	cm <sup>3</sup> /1000 strokes		3,0
Full-load delivery with charge-air	-	-	cm <sup>3</sup> /1000 strokes		
pressure 1.4 Idle speed regulation	400	16,0-22,0	cm <sup>3</sup> /1000 strokes	1	3,0
1 5 Start	100	min. 70,0	cm³/1000 strokes		
1.6 Full-load speed regulation	1200	36,0-44,0	cm <sup>3</sup> /1000 strokes		

2. Test Sp	rev/min	Ons Checking values in brackets 500 0,6-1,6(0,4-1,8)	700	1150
21 Timing device	mm		(2:1-3,5)	5,2-5,9(4,8-6,2)
22 Supply pump	rev/min	200	700	1150
	kp/cm²	2,1-2,6(1,9-2,8)	(4,7-5,6)	6,6-7,1(6,4-7,3)
Overflow delivery	rev/min cm³/10 s			

2.3 Fuel deliveries					
Speed control lever	Delivery lever	rev/min	cni³/1000 strokes		Charge-air pressure kp/cm²
End stop	Full	1250-1300	0		•
		1200		(34,0-46,0)	
		1150	70,0-73,0	(69,0-74,0)	
		700		(69,0-71,0)	
		500	66,0-70,0	(65,0-71,0)	
	Stop	1150	0		
idle stop	Full	530-580	0		
		400		(14,0-24,0)	
	Start	100	min.70,0		

Angle to the stop-plate	Pre-setting dimensions	
Pump $a = 25 + 4^{\circ}$ $b = 42 + 8^{\circ}$ $c = 30 - 8^{\circ}$ $c = 60 + 8^{\circ}$	Pump Dimension N≠ 3,8 Dimension V= 24,65 mm	

## Test Specifications Distributor-type Fuel-injection Pumps

WPP 001/4 VWW 2,0 b 1 3. Edition

Testoil-ISO 4113

VE 5/10 F 2400 L 45 (P) 0 460 405 005;

supersedes 6.82 company: VW/Volvo 069.3

Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

0.14

2. Test Specifications checking values in brackets (

mm  $\stackrel{+}{-} 0.02 (0.04)$ 

see VDT-W-460/ ..

1. Settings	Rot. speed rev/min	Settings	and the second s	Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1400	2,4-2,8	mm		
1.2 Supply pump pressure	1400	5,0-5,6	bar (kgf/cm²)		
1.3 Full-load delivery without charge-air pressure	1400	33,5-34,5	cm <sup>3</sup> /1000 strokes		2,5 (3,0)
Full-load delivery with charge-air pressure	-	-	° cm³/1000 strokes		
1.4 idle speed regulation	375	6,0-8,0	cm <sup>3</sup> /1000 strokes		2,5 (3,0)
1.5 Start	100	min.53,0	cm³/1000 strokes		
1.6 Full-load speed regulation	2500	21,0-27,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery	•	-			

2. 100k Opt	21100110110	Checking values in o				
2.1 Timing device	n = rev/min mm	100 1,3-2,1(1,		1400 (1,9-3,3)	240 5,1-5,91	00 (4.8-6.2)
2.2 Supply pump	n = 16V/min ber (kgf/cm²)	50 2,8-			240 7,4-8	
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	50 55-138(40-	-		240 55-138	)0 (40-153)
2.3 Fuel delivenes Speed control lever	Rot speed	Fuel delivery cm³/1000 strokes		Charge-air press bar (kgt/cm²)	3. Dimen	SiONS for assembly and adjustment mm
End slop	2650 2500 2400 1400 750	max. 13,0 27,5-29,5 23,0-26,0	(20,0-28,0) (26,2-30,8) (31,7-36,3) (21,5-27,5)		K KF MS SVS	- 5,7-5,9 1,7-1,9 max.3,0
switch-off elect.	400	0	and a second control of the state of the second control of the sec		A XK	18,5-20,5 9,0-12,5
idle stop	500 375	max. 3,0	(4,0-12,0)		Observations	
End stop	400 500	min. 14,5 max. 21,5				
2.4 Solenoid	max. cut-m voltag	<ul><li>xxx min.</li><li>rated volta</li></ul>	10,0 V ge 12V.			

F9

## **Test Specifications** Distributor-type Fuel-injection Pumps

2. Test Specifications checking values in brackets (

WPP 001/4 VWW 2,0 b

3. Edition

VE 5/10 F 2400 L 45-1 (P)

0 460 405 007;

supersede6\_82 company:VW/Volvo engine: 069.3

### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel injection Pump Test Benches and Testers

Test Instructions and Test Equipment

0.14

mm = 0,02 (0,04)

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Tirning device travel	1400	2,4-2,8	mm		
1.2 Supply pump pressure	1400	5,0-5,6	bar (kgf/cm²)		
1.3 Full-load delivery without charge-air pressure	1400	33,5-34,5	cm <sup>3</sup> /1000 strokes		2,5 (3,0)
Full-load delivery with charge-air pressure	-	-	cm <sup>3</sup> /1000 strokes		
1.4 Idle speed regulation	375	6,0-10,0	cm <sup>3</sup> /1000 strokes		2,5 (3,0)
1 5 Start	100	min. 53,0	cm³/1000 strokes		
1.6 Full-load speed regulation	2500	21,0-27,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery	-	-			

2.3 Timing device	n = rev/min	1000		1400	20	400
-	mm	1,3-2,1(1,0	1-2,4)	(1,9-3,3)		(4,8-6,2)
2.2 Supply pump	n = rev/min ber (kgf/cm²)	500 2,8-3,4			_	400 -8,1
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	500 55-138(40-1	53)		55-138(	400 40-153)
2.3 Fuel deliveries					3. Dimen	SIONS for assembly and adjustment
Speed control lever	Rot speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	mm
End stop	2650 2500 2400 1400 750	max. 13,0 27,5-29,5 23,0-26,0	(20,0-28,0) (26,2-30,8) (31,7-36,3) (21,5-27,5)		K KF MS SVS	5,7-5,9 1,7-1,9 max.3,0
**************************************	2400	0			a XK B XL	18,5-20,5 9,0-12,5
Idle stop	500 375	max. 3,0	(4,0-12,0)		Observations	
End stop	400 500	min. 14,5 max. 21,5				
2.4 Solenoid	max. cut+n volt 减益%资格及XXX		10.0 V age 12V.			

## **Test Specifications** Distributor-type Fuel-injection Pumps

WPP 001/4 VWW 1,6 L4

1. Edition

VE 4/9 F 2400 R 66-9 0 460 494 117

supersedes company:

VWW 086 engine:

Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

see VDT-W-460/...

1. Settings	Rot speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	2,9-3,3	mm		
1 2 Supply pump pressure	1500	4,9-5,5	bar (kgf/cm²)		
1 3 Full-load delivery without charge-air pressure	1500	31,5-32,5	cm <sup>3</sup> /1000 strokes		3,0
Full-load delivery with charge-air pressure	475	6 0 10 0	cm <sup>3</sup> /1000 strokes		3,0
1.4 Idle speed regulation		6,0-10,0	cm3/1000 strokes		
1.5 Start	100	min. 38,0	cm³/1000 strokes		
1.6 Full-load speed regulation	2600	11,0-17,0	Cities 1000 strokes		
1.7 Load-dependent start of delivery					

2.1 Timing device	n = rev/min	1,3-2,1 (1,0-2,4)	1500 (2,4-3,8)	6,1-6,9	2400 (5,8-7,2)
2.2 Supply pump	n = rev/min	600			2400
	bar (kgf/cm²)	2,8-3,4			7,0-7,6
Overflow delivery	u = ten/miu	600			2400
	cm <sup>3</sup> /10 s	55-138 (40-153)			(40-153)
2.3 Fuel delivenes			! Charge-air press.	3. Dimen	sions for assembly and adjustment imm
Speed control lever	Rot speed	Fuel delivery cm³/1000 strokes	bar (kgf/cm²)		
End stop	2800 2600	max. 2,5 (10,0-18,0)		K	3,2-3,4
	2400	26,5-28,5 (25,2-29,8) (29,7-34,3)		KF	5,7-6,0
	1500 600	(29,7-34,3) 19,5-22,5 (18,0-24,0)		MS	1,3-1,5
	000	13,5 22,5 (10,5 21,5)		svs	2,5
				* FH	1,8-2,4
switch-off elect.	400	0		*XK	18,4-20,4 9,6-12,7
idle stop	1200	max. 5,0		Observations *Operati	
	600 475	max. 6,0 (4,0-12,0)		stroke	•
End stop	400 500	min. 15,5 max. 21,5		Julia	( M.O )
2.4 Solenoid	max. cut-in voit	xxx min. 10 V			

Test Specifications
Distributor-type
Fuel-injection Pumps

WPP 001/4 VWW 1,6 b 1 2. Edition

VE 4/9 F 2400 R 66

supersede5.82 company: VWW engine: 1,6 L

0 460 494 048

Overflow temperature 45° C

All test specifications are valid only for Boach Fuel-injection Pump Test Benches and Testers

**Test Instructions and Test Equipment** 

Pre-strake setting

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	2,9-3,3	mm		
1.2 Supply pump pressure	1500	4,9-5,5	bar (kgf/cm²)		
1.3 Full-load delivery without charge-air pressure	1500	31,5-32,5	cm <sup>3</sup> /1000 strokes		2,5 (0,3)
Full-load delivery with the charge-air pressure	-		cm³/1000 strokes		
1.4 title speed regulation	415	6,6-10,0	cm <sup>3</sup> /1000 strokes		2,5 (0,3)
1.5 Start	100	min. 38,0	cm <sup>3</sup> /1000 strokes		
1.6 Full-load speed regulation	2600	11,0-17,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery	-	-			

2. Test Spe	cifications	checking values in br	ackets ( )			
2.1 Timing device	n = rev/min mm	100 1,3 - 2,1	0 (1,0-2,4)	1500 (2,4-3,8)		100 (5,8-7,2)
2.2 Supply pump	n = rev/min ber (kgf/cm²)	40 2,1-2			2400 7,0-7,	6
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	50 55 <b>-1</b> 38	0 (40-153)		2400 55-138 (4	0-153)
2.3 Fuel delivenes					3. Dimen	SIONS for assembly and adjustment
Speed control lever	Rot speed rev/min	Fuel delivery cm³/1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	mm
End stop	2700 2600 2400 1500 600	2,5-9,5 27,0-29,0 19,5-22,5	(10,0-18,0) (25,7-30,3) (29,7-34,3)		K KF MS SVS FH #)	3,2 - 3,4 5,7 - 5,9 1,3 - 1,5 max. 2,5 1,8 - 2,4
switch-off					* K	18,4 - 20,4
elect.	400	0			₹ L	9,1 - 12,9
End stop	1200 600 415 400 500	max. 3,0 max. 6,0 min. 15,5 max. 21,5	(4,0-12,0)		Observations *Operati stroke	•
2.4 Solenoid	mex. cut-n volta	9° XXX min.				

## Test Specifications Distributor-type Fuel-injection Pumps

WPP 001/4 VMA 3,6 a

2. Edition

VE 6/11 F 2100 L 63

supersedes 6.82 company: VM Cento engine: HR 692 HT

0 460 416 014

**(B)** 

Testoil-ISO 4113

### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

0.2

+ 0,02 (0,04)

see VDT-W-460/...

1. Settings	Rot, speed revirmin	Settings		Charge-air press. har (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1800	6,5-6,9	mm	0,65	
1 2 Supply pump pressure	1800	6,6-7,2	bar (kgt/cm²)	0,65	
1.3 Full-load delivery without	600	36,0-40,0	cm <sup>3</sup> /1000 strokes	0	
charge-air pressure Full-load delivery with	1500	47,5-48,5	cm³/1000 strokes	0,65	3,5
charge-air pressure 1.4 Idle speed regulation	450	10,0-14,0	cm³/1000 strokes	0	3,0
1.5 Start	100	min. 42,0	cm³/1000 strokes	0	
1.6 Full-load speed regulation	2400	22,0-30,0	cm <sup>3</sup> /1000 strokes	0,65	
1.7 Load-dependent start of delivery					

2. Test Spec	ifications	checking values in brackets (	)		
2.1 Timing device LDA=0,65 bar	n = rev/min	1000 2,1-2,9(1,8-3,2)	1500 4,7-5,3(4,3-5,7)	1800 6,0-7,4)	2100 7,9-8,6(7,5-8,
2.2 Supply pump LDA= 0,65 bar	n = rev/min bar (kgf/cm²)	400 1,7-2,3	7	2100 ,8-8,4	
Overflow delivery n = rev/min cm <sup>3</sup> /10 s		500 55-138 (40-153	2100 55-138 (40-153)		.53)
			<del></del>	2 Dimer	eione

2.3 Fuel deliveries				
Speed control lever	Rot speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press bar (kgf/cm²)
End stop	2700 2450 2400 2100 1500 * 600	max. 1,0 9,0-15,0 43,9-46,9 38,5-41,5	(7,5-16,5) (21,5-30,5) (42,5-47,9) (45,3-50,7) (37,3-42,7) (34,6-41,4)	0,65 0,65 0,65 0,27
switch-off	2100	0		
Idle stop	700 550	max. 1,0 2,0-8,0	(0,5-9,5)	0
	450		(7,5-16,0	
End stop	350 450	min. 40,0 max. 45,0		
2.4 Salenard	max. cut-in voltage	mated vol	10,0 V tage 12V.	

Designation	for assembly and adjustment mm
K	
KF	6,3-6,5
MS SVS	0,9-1,1 max. 2,2
+ FH	1,8-2,4
<b>★</b> XK	20,2-22,2
₹ XL	10,8-13,1
Observations	
+ Manifold	d-pressure
compens	ator stroke
= 4,0 m	m.

Correction at the

adjusting nut. (46)

1.83 Geschäftshereich KH. Kundendienst, Kfz-Ausrustung. C 1990 by Robert Bosch GmbH, Postfach 50, D-7000 Stuttgart 1. Printed in the Federal Republic of Germany Imprime en République Federale d'Aljemagne par Robert Bosch GmbH.

**BOSCH** 

**6** 

Test Specifications
Distributor-type
Fuel-injection Pumps

40

WPP 001/4 FIA 1,7 h
1. Edition

n

VE 4/10 F 2050 R 124 0 460 404 031

company:Fiat engine: 8144-81

### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

2050

Pre-stroke setting

0,2

2. Test Specifications checking values in brackets (

mm = 0,02 (0,04)

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1,1 Timing device travel	1500	6,7-7,1	mm	0,75	
1 2 Supply pump pressure	1500	6,1-6,7	bar (kgf/cm²)	0,75	
1.3 Full-load delivery without charge-air pressure	600	43,5-44,5	cm <sup>3</sup> /1000 strokes	0	
Full-load delivery with charge-air pressure	1500	61,5-62,5	cm <sup>3</sup> /1000 strokes	0,75	3,0
1.4 Idle speed regulation	350	12,5-16,5	cm <sup>3</sup> /1000 strokes	0	3,0
1.5 Start	100	min. 60	cm <sup>3</sup> /1000 strokes	0	0,0
1 6 Full-load speed regulation	2200	22,0-28,0	cm³/1000 strokes	0,75	
1.7 Load-dependent start of delivery	1500	-			

2.1 Timing device	n = rev/min	600	•	1500	20!	50
.DA=0,75 bar	mm	2.4-2.8 (1	.7-3.1)	(6,2-7,6)	8,6-9,	4 (8,3-9,7)
2.2 Supply pump	n = rev/min	400		600	209	50
DA=0,75 bar	bar (kgf/cm²)	3,4-4,0		4,0-4,6	7,4-	8.0
Overflow delivery	u = tea/tuin	600			20	50
	cm <sup>3</sup> /10 s	55-138 (40	-153)		55-138	(40-153)
2.3 Fuel delivenes					3. Dimer	for assembly and adjustment
Speed control lever	Rot speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	mm
End stop	2400	max. 1.5		0,75	K	-
	2300	max. 5,0	(20 E 20 E)	0,75	KF	5,7-6,0
	2200 2050	53,1-56,1	(20,5-29,5) (51,9-57,3)	0,75	MS	1,2-1,4
	1500 * 800 600		(59,3-64,7) (51,6-58,4) (40,6-47,4)	0,75 0,2 0	svs	3,2
switch-off					A XK	25,0-27,0
	2050	0			в ХГ	9,8-13,1
idle stop	350 450 500	max. 3,5 max. 2,0	(10,0-19,0)	•	* Manifold-pressu compensator str = 4,0 mm. Correction at t	
End stop	350 450	min. 55 max. 55				

BOSCH

max, cut-in voltage

2.4 Solenoid

Seschigitzhereich KN: Kundengienst, Kfz-Auerustung. C. 1980 by Robert Bosch, Gmbil, Poetfech 50: D-7000 Sturtgart 1: Printed in the Federal Republic of Germany. Browne an Republicular Féderale d. Allemaune par Robert Bosch, Gmbild.

xxx min. 10 V rated voltage 12V.

adjusting nut. (46)

**(6)** 

Testoil-ISO 4113

**Test Specifications** Distributor-type Fuel-injection Pumps

2. Test Specifications checking values in brackets (

WPP 001/4 VMA 3,6 a 1

1. Edition

VE 6/11 F 1900 L 63-1

supersedes-

company: VM-Motori engine: HR 6 H

0 460 416 029

### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Pre-stroke setting 0,2 mm  $\stackrel{+}{=}0,02$  (0,04)

Test Instructions and Test Equipment

Pre-stroke setting

see VOT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Tirning device travel	1500	3,8-4,2	mm	0,75	
? 2 Supply pump pressure	1500	4,9-5,5	bar (kgf/cm²)	0,75	
1.3 Full-load delivery without	600	42,3-43,3	cm <sup>3/1000</sup> strukës	0	
charge-air pressure Full-load delivery with	1500	61,0-62,0	cm³/1000 strokes	0,75	3,0
charge-air pressure 1.4 Idle speed regulation	350	20,0-24,0	cm <sup>3</sup> /1000 strokes	0	3,0
1.5 Start	100	min. 40,0	cm <sup>3</sup> /1000 strokes	0	
1.6 Full-load speed regulation	2100	20,0-26,0	cm <sup>3</sup> /1000 strokes	0,75	
1.7 Load-dependent start of delivery	-				

2.1 Timing device LDA=0,75 bar	n = rev/min	1000 0,9-1,7 (0,6-2,0)	1500 (3,3-4,7)	5,6-6,4	1850 (5,3-6,7)
2.2 Supply pump LDA=0,75 bar	n = rev/min ber (kgt/cm²)	600 2,0-2,6	1850 6,0-6,6		
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	600 55-138 (40-153)	190 55 <b>-</b> 138	00 (40-153)	
2.3 Fuel deliveries				3. Dimen	SiONS for assembly and adjustment
Speed control lever	Rot. speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes	Charge-air press bar (kgf/cm²)	Designation	
End stop 2200 max 1.5		0,75 0,75 0,75 0,75 0,75 0,3 0	K KF MS SVS	6,3-6,6 0,9-1,1 max. 4,3	
switch-off	1900	0		a XK a XL	20,2-22,2
Idle stop 350 400 450 End stop 400 500		(17,5-26,5 7,5-12,5 (5,5-14,5 max. 3 min. 49 max. 44	5)	observations  * Manifold-pressure  compensator stroke  = 4,0 mm.  Correction at the	
2.4 Solenoid	max. cut-in volt	mated voltage 12V	adjusting nut.(46)		

WPP 001/4 FOR 2,3 a

2. Edition

VE 4/10F 1800 R 14 0 460 404 001

superseded . 82 company: Ford engine: CID 144

### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

6

Testoil-ISO 4113

mm + 0.02 (0.04)

900 VDT-W-460/...

1. Settings	Rot speed rev/min	Settings	Charge-air press. bar (trgl/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1600	3,8 - 4,2 mm		
1.2 Supply pump pressure	1600	5,5 - 6,1 ber (kgl/cm²)		
1.3 Full-load delivery without charge-air pressure	1250	40,5 - 41,5 cm <sup>3/1000</sup> str	1	3,0
Full-toad delivery with charge-air pressure	-	_ cm <sup>3</sup> /1000 str	okes	
1.4 idle spend regulation	425	14,0 - 18,0 cm <sup>3</sup> /1000 str	okes	3,0
1.5 Start	100	min. 70 cm <sup>3</sup> /1000 str	okes	
1.6 Full-load speed regulation	2050	9,0 - 15,0 cm <sup>3/1000 str</sup>	okes	
1.7 Load-dependent start of delivery	-			

2. Test Spec	cifications	checking values in brai	ckets ( )				
1 Timing device	n = rev/min mm	1000 0,5-1,5(0,3-		1600 ,3-4,7)	1800 4,5-5,3(4,2-5,6)		
2.2 Supply pump	n = rev/min bar (kgt/cm?)	400 1,7-2,3		1800 6,0-6,6			
overflow delivery	n = rev/min cm <sup>3</sup> /10 s	500 55-138(40-	153)		1800 55-138(40-153)		
2.3 Fuel deliveres	1800	: Fuel delivery		Charge-air press.	3. Dimen	SIOPS for essembly and adjustment mm	
Speed control lever	Rot speed revimin	cm³/1000 strokes		ber (kgf/cm²)			
End stop	2170-2260 2050	0	(8,0-16,0)		ĸ	-	
	1900	31,0-37,0	(30,0-38,0)		KF	5,7-5,9	
	1750	38,0-40,0	(36,7-41,3) (38,7-43,3)		MS	2,0-2,2	
	1250 800	37,5-40,5	(36,0-42,0)		SVS	max. 4,2	
swech-off					A	7,7-12,7	
	1800	0	_		•	8,7-11,9	
idle stop	600-700 425	0	(12,0-20,0		Observations For fur	ther detail:	
End stop	215 285	min. 70 max. 35			see ove		
2.4 Solenoid	mex. cut-in voltage	<ul><li>xxx min.</li><li>rated voltag</li></ul>	10 V e 12V.		] [		

F16

BOSCH Geschaftsbarench 101 Kundendandt HRT-Austrations
C 1900 by Robert Boach Great, Pourfact Sci 0, 7000 Shutt
Importing on Resource of Agents According to Agent Agent Sci

Set by means of notched plate Setting of the upper notched plate at a plunger of 0,36 mm related to outlet "A".

## **Test Specifications** Distributor-type Fuel-injection Pumps

WPP 001/4 FOR 2,3 b 2. Edition

YE 4/10F 1800 R 15 0 460 404 002

supersedes Ford **CID 144** 

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-Injection Pump Test Benches and Testers

**Test Instructions and Test Equipment** 

Pre-stroke setting

0,3

mm ± 0,02 (0,04)

see VDT-W-460/...

1. Settings	Rot speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1600	3,8-4,2	mm		
1.2 Supply pump pressure	1600	5,5-6,1	bar (kgf/cm²)		3,0
1.3 Full-Ir delivery without charge are pressure	1250	40,5-41,5	cm³/1000 strokes		3,0
Full-load delivery with charge-air pressure	-	-	cm³/1000 strokes		
1.4 Idle speed regulation	425	14,0-18,0	cm <sup>2</sup> /1000 strokes		3,0
1.5 Start	100	min. 70	cm³/1000 strokes	į	
1.6 Full-toad speed regulation	2050	9,0-15,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery	-				

2.1 Timing device	n = rev/min	1000		1600	1800			
	ന്ന	0,5 - 1,5 (0	(3-1,7)	3,3-4,7)	4,5-5,3 (4,2-5,6)			
2.2 Supply pump	ก = เซษ/กษก	400			1800			
	ber (kgf/cm²)	1,7-2,3			+	6,0-6,6		
Overflow delivery	n = rev/min	500 55-138 (40-1	53)	55-	1800 138 (40-153)			
2.3 Fuel deliveries		1			3. Dimen	for assembly		
Speed control lever	Rot. speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes		Charge-air press. ber (kgf/cm²)	Designation	and adjustment mm		
End stop	2170-2260		0		_	-		
	2050		(8,0-16,0	1	K			
	1900	31,0-37,0	(30,0-38,	(c)	KF	5,7-5,9		
	1750	38,0-40,0	(36,7-41,	3)	MS	2,0-2,2		
	1250		(38,7-43,	3)	svs	max. 4,2		
	800	37,5-40,5	(36,0-42,	0)				
switch-off					A	7,7-12,7		
	1800	0			8	8,7-11,9		
idle stop	600-700	0			Observations			
	425		(12,0-20	,0)	-			
End stop	215	min. 70			For further details see overleaf			
	285	max. 35						
2.4 Salenaid	mex. cut-in voltage	)		-				
	test voltage							

Set by means of notched plate Setting of the upper notched plate at a plunger of 0,36 mm related to outlet "A".

## **Test Specifications** Distributor-type Fuel-injection Pumps

WPP 001/4 FOR 2,3 c

1. Edition

VE 4/10 F 1800 R 14-1 0460 404 005 VE 4/10 F 1800 R 15-1 0460 404 006

Ford 144 c/D

Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

0,2

mm = 0.02 (0.04) mm

300 VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel 1.2 Supply pump pressure 1.3 Full-load delivery without charge-air pressure Full-load delivery with charge-air pressure 1.4 Idle speed regulation 1.5 Start 1.6 Full-load speed regulation 1.7 Load-dependent start of delivery	1600 1600 1250 - 425 100 2050	3,8-4,2 5,5-6,1 40,5-41,5 - 14,0-18,0 min. 70 9,0-15,0	mm ber (kgf/cm²) cm³/1000 strokes cm³/1000 strokes cm³/1000 strokes cm³/1000 strokes		3,0

2. Test Spe	cifications	checking values in brackets (	)	
2.1 Timing device	n = rev/min	1000 0,5-1,5 (0,3-1,7)	1600 (3,3-4,7)	1800 4,5-5,3 (4,2-5,6)
		400		1800
2.2 Supply pump	bar (kgf/cm²)	1,7-2,3		6,0-6,6
Overflow delivery	n = rev/min	500		1800
•	cm <sup>3</sup> /10 s	55-138 (40-153)		55-138 (40-153)
2.3 Fuel deliveries				3. Dimensions for assembly and adjustment

	cm <sup>3</sup> /10 s	55-138 (40-153)		55-138	(40-153)
2.3 Fuel deliveries				3. Dimen	tor assembly and adjustment
Speed control lever	Rot speed rev/min	Fuel delivery cm3/1000 strokes	Charge-air press. bar (kgf/cm²)	Designation	mm
End stop	2170-2260	0			
	2050	(8,0-16,0)		K	-
	1900	31,0-37,0 (30,0-38,0)		KF	5,7-5,9
	1750	37,0-39,0 (35,7-40,3)		MS	2,0-2,2
	1250	(38,7-43,3)		SVS	max. 4,2
	800	39,5-42,5 (38,0-44,0)			
switch-off				A XK	19,3-21,3
	1800	0		8 XL	6,9-10,2
idle stop	425	(12,0-20,0)		Observations	
	630-690	0			
End stop	215	min. 70		For fur	rther details
	285	max. 35		266 046	:i ieai
2.4 Solenoid	max. cut in volta	rated voltage 12V.			

Set by means of notched plate Setting of the upper notched plate at a plunger of 0,36 mm related to outlet "A".

# Test Specifications Fuel Injection Pumps (1) and Governors

WPP 001/4 FIA 13,8 n 1 1.Edition

PE 8 P 120 A 920/5 LS 3812 R

RQV 300-1050 PA 475

supersedes

companyFiat

engine: 8281.22.050

Komb.-Nr. 0 401 848 749

1-8-4-3-6-5-7-2 je 45 ° + 0,5 ° (+ 0,75 °)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers.

### A. Fuel Injection Pump Settings

Port closing at prestroke (3, 45-3,65) mm (from BDC)

		1,43-3,037				
Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1050	10,9+0,1	20,7-21,1	0,5(0,9)			
300	4,9-5,1	1,7-2,3	0,8(1,2)			
					ł	

Adjust the fuel delivery from each outlet according to the values in

### **B.** Governor Settings

Testoil-ISO 4113

Upper rated s	peed rev/min	Control rod	Intermediate	rated sp	eed Control rod	Lower rated speed		Sliding sleeve travel		
deflection of control	Control rod travel mm	travel	deflection of control lever	rev/min 5	travel	Degree of deflection of control lever 7	rev/min	Control rod travel mm 3	rev/min	mm 11
max.	1080	15,2-17,8	-	-	-	ca.10	100 300	min. 7,5 5,9-6,1	300 450	1,6-1,7 3,5-4,2
ca. 60	9,9 4,0	1090-1100 1180-1210		£			300	13,9-0,1	800	6,1-6,3
	1300	0 - 1,0				310-415 3a				

Torque controi travel a =

mm

### C. Settings for Fuel Injection Pump with Fitted Governor

Fijil-load of Control-roo Test on ten	elivery d stop np 40°C (104°F) 2	Rotational-speed 20 Imitation intermediate speed	Fuel delin high idle s	rery characteristics (\$6)	Starting Idle switching	. 0	Torque- travel	control 5
rev/min	cm <sup>3</sup> /1000 strokes	revimin 49	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	tev/min	travel mm
1	2	3	4	5	6	7	8	9
LDA 1050	0,7 bar 207,0-211,0 (204,0-214,0		LDA 105			230,0-250,0 (226,0-254,0		-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

2.83

## D. Adjustment Test for Manifold Pressure Compensator

Testain =

500 rev/min decreasing pressure - in bar gauge pressure

PIA 13,8 n 1 -2-

Pump/governor	Setting	Measurement	diminution Control rod travel-
	Gauge pressure = bar	Gauge pressure = bar	difference mm (1)
PE 8 P LS 3812 + RQV PA 475	0,70	0 0,30 0,25	10,9-11,0 8,5-8,6 10,4-10,5 9,1-9,4

Notes.

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

### **Test Specifications** 2 Fuel Injection Pumps 2 and Governors

WPP 001/4 3. Edition MB 17.4a

estoil-ISO 4113

PE 10 P 100 A 320 LS 842 RO 300/1150 PA 187-1 R supersedes2.80

company Daimler Benz

OM 403

235,4 kW (320 PS)

 $10-9-4-1-8-7-6-3-5-2 \pm 0.50$ 0-45-72-117-144-189-216-261-288-333 (0,75°)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

### A. Fuel Injection Pump Settings

Port closing at prestroke

(3.35-3.55)

mm (from BDC)

Zy1.10

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Oifference cm <sup>3</sup> / 100 strokes	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
1150	11,4-11,5	10,1 - 10,3	0,3(0,6)			_
300	8,0-8,2	1,4- 2,0	0,3(0,5)			

Adjust the fuel delivery from each outlet according to the values in

### **B.** Governor Settings

PRG check (1)		Full-load speed regulation Setting point Test speci			Idle speed regula Setting point Control		Test specifications Control rod		Torque control  Control rod		
rev/min	Control rod travel mm	rev/min	Control rad travel rmm 4	Control red travel rem 5	rev/min	rev/min	red travel		travel mm 10	rev/min 11	travel mm 12
650	13,8-14,6	650	14,2	10,4	1195-1210	300	8,1	100	min.10,6	1150	11,4-11,5
1350	0-1			4,0	1245-1275			300	8,0-8,2	600	11,4-11,6
								425	465=2,0		

Torque-control travel on flyweight assembly dimension a =

1195-1210 min

rod travel

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F)		Control rod stop	Fuel delive	rry characteristics	34-VI	Starting fuel delivery 6 (Centre mail travel		
rev/min	cm <sup>3</sup> /-1000 strokes	rev/mm	rev/mm 4	cm <sup>3</sup> /-1000 strokes 5		rev/min 6	cm <sup>3</sup> /1000 strokes / mm	
1150	101,0 - 103,0 (39,0 - 105,0)	600	-	-		100	125,0 - 1 5,0	

Checking values in brackets

2.83

40

WPP 001/4 MAN 17,4 a1

2. Edition

PE 10 P 110 A 520/4 LS 846

RO 250/1150 PA 561

supersed 2.82 company MAN

D 2540 MT 323 kW (439 PS)

1 - 8 - 7 - 6 - 3 - 5 - 2 - 10 - 9 - 4 $0 - 27 - 72 - 99 - 144 - 171 - 216 - 243 - 288 - 315 ^ + 0,5 ^ (+0,75 ^ )$ 

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

### A. Fuel Injection Pump Settings

Port closing at prestroke

Testoil-ISO 4113

(2.95-3.15)

mm (from BDQty1. 10

Plotational speed rev/min 1	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1150	11,9+0,	1 14,0 - 14,2	0,4 (0,8			
250	6,9-7,1	1,1 - 1,7	0,4 (0,7			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checkin FRG che	g of slider ck (1)	Full-load : Setting po	•	•	cifications (4)	idle spec Setting p	•		critications (5)	Torque d	(3)
rev/min 1	Control rod travel mm 2	rev/min 3		Central cal browl rnm 5	rev/min 6	r <del>ev</del> /min 7	Combrel red travel mm 8	rev/пчп 9	Control rod travel mm	rev/min 11	Control rod travel mm 12
000 VH	19,2-20,8 • max. 46°	600	20,0		1195-1210 1300-1330 0 - 1,0	250	7,0	250	min.8,5 6,9-7,1 90 = 2,0		11,9-12,0 11,9-12,1

Torque-control travel on flyweight assembly dimension a =

1

Speed regulation: A1195-1210 min -1

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	etivery on ontrol lever on 40°C (104°F)	Control rod stop 3	Fuel delive	ery characteristics 3b	Starting fi Idle spee	d Carety
r <del>av</del> /mati 1	cm <sup>3</sup> /~1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	red travel cm <sup>3</sup> /1000 strokes / mm 7
LDA 1150	0,9 bar 140,0 - 142,0 (137,0 - 145,0)	_	LDA 750 LDA 500	0,9 bar 134,0 - 138,0 (131,0 - 141,0) 0 bar 115,0 - 118,0 (112,0 - 121,0)	100	145,0 - 175,0

Checking values in brackets

### D. Adjustment Test for Manifold Pressure Compensator

Test at n =

SOC

rev/min decreasing pressure - in bar gauge pressure

MAN 17,4 a 1

-2-

300			1911 17,94 a 1
Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE10PLS 846 + PA 561	0,9	0 0,38 0,33	11,9 - 12,0 11,1 - 11,2 11,7 - 11,8 17,3 - 11,5

Notes

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

3

# Test Specifications Fuel Injection Pumps (2) and Governors

40

WPP 001/4 FIA 13,8 o
4. Edition

Εn

PE 8 P 120 A 920/5 LS 3804

RQ 300/950 PA 474

supersedee 82 company Fiat

engine: 8280.22.007

1 - 8 - 4 - 3 - 6 - 5 - 7 - 2 je  $45^{\circ} + 0.5^{\circ} (+ 0.75^{\circ})$ 

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke

(3.45-3.65)

mm (from BDC)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>2</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
950	10,9+0,1	20,5 - 20,9	0,5(0,9)			
300	4,9-5,1	1,9 - 2,5	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checiun PRG che	g of slider ck (1)	Full-load s Setting po	•	•	cifications (4)	idle spec Setting p	•		cifications (5)	Torque d	(3
rev/min	Control rod travel mm	rev/min 3	Central rad travel rnm 4	Central red travel rnm 5	rev/min 6	rev/min 7	Control red travel mm 8		Control rod travel mm	rev/min 11	Control rod travel mm
600 VH:	19,2-20,8 max. 49°	600	20,0		995-1010 1030-1060 0 - 1,0	300	5,0	100 300 350-3	min. 7,5 4,9-5,1 90=2,0mm	950 600	11,1-11, 11,1-11,

on flyweight assembly dimension a =

\_\_\_

Speed regulation A995-1010 min-1

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	elivery on control lever pp 40°C (104°F)	Control rod stop 3a	Fuel delive	ery characteristics 3b	Starting for idle spee	uel delivery
rev/men	cm³/-1000 strokes	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes / mm 7
LDA	0,7 bar	-	LDA	0 bar	100	19,5-21,0 mm R
950	205,0-209,0 (202,0-212,0)		950	149,0-153,0 (146,0-156,0)		

Checking values in brackets

#### **D. Adjustment Test for Manifold Pressure Compensator**

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

FIA 13,8 o

-2-

Pump/governor	Setting	Measurement	diminution Control rod travet- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 8 P LS 3804 +PA 474	0,70	0 0,35 0,28	10,9 - 21,0 8,3 - 8,4 10,3 - 10,4 9,0 - 9,3

Notes

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

WPP 001/4 FIA 13,8 p 3. Edition

PE 8 P 120 A 920/5 LS 3804

RQ 300/1200 PA 356 R

1-8-4-3-6-5-7-2 je 45 ° + 45 ° + 0,50 (+ 0,75 °)

supersedes 2.81 company: Fiat

engine:

8280.02.405

Komb.-Nr. 0 401 848 719 0 401 848 715

Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

mm (from BDC)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1200	9,3-9,4	17,3-17,7	0,5(0,9)			
300	5,9-6,1	2,8-3,6	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Checkin PRG che		Full-load s Setting po	•	-	cifications (4)	idle spec Setting p	_		cifications (5)	Torque o	(3)
rev/min	Control rod travel mm	rev/min 3	Central red travel rnm 4	Central red travel rmm 5	rev/min 6	rev/min 7	Control red travel rnm 8	rev/min 9	Control rod travel mm	rev/min 11	Control rod travel
650	15,6-16,4	650	16,0	8,3 4,0 1400	1245-1260 1280-1310 0 - 1,0		6,0	100 300 400-	min. 7,5 5,9-6,1 440 = 2,0	650	9,3-9,4 9,3-9,5

Torque-control travel on flyweight assembly dimension a 1245-1260 min<sup>-1</sup> Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	letivery on control lever np. 40°C (104°F)	Control rod stop	Fuel delive	ery characteristics	M_1	Starting for the speed of the s	Cantire
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	,	rev/min 6	red travel cm <sup>3</sup> /1000 strokes/ mm 7
1200	173,0-177,0 (170,0-180,0)	•	-	-		100	19,5-21,0

Checking values in brackets

Testoil-ISO 4113

# **Test Specifications** Fuel Injection Pumps 2 and Governors

WPP 001/4 RAB 9,7 b 1.Edition

PES 6 A 95 D 420 LS 2595 Komb.-Nr. 0 400 846 514

RQ 200/1100 AB 1094-1 R

supersedes company:RABA

engine: D 2356 HM 6 U

162 kW

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

### A. Fuel Injection Pump Settings

Port closing at prestroke

(1 05-2 15)

		1,95-2,15/				
Rotational speed rev/min 1	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	11,3+0,1	12,1-12,3	0,3(0,6)			
200	6,0-6,2	0,8-1,4	0,3(0,5)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Checkin PRG che rev/min 1	Control rod	Full-load: Setting po rev/min 3	•	•	rev/min	Idle spec Setting p rev/mm 7			cifications Control rod travel mm	rev/min	Control rod 3
550 VH =	19,2-20,8 max. 46°	550	20,0		1145-1160 1175-1205		6,0	100 200 290- 350	min.7,5 5,9-6,1 330=2,0 max.1,0	1100 500 750 855	11,3-11,4 12,0-12,1 11,7-11,9 11,5-11,7
on Rysea	control travel			,3 <sub>mm</sub>		ed regula	ation: At		160 min-1		1 mm less contro rod trave

#### C. Settings for Fuel Injection Pump with Fitted Governor

	elivery on control lever np 40°C (104°F)	Control rod stop 3	Fuel delive	ery characteristics 36	Starting fuel delivery idle speed		
rev/min	cm³/-1000 strokes	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes	rev/min	Carrier 000 Stronges   William N W	
1100	121,0-123,0 (119,0-125,0)	500	800 500	122,0-125,0 (119,5-127,5) max. 117,0 (max. 119,0)	100	17,5-18,1	

Checking values in brackets

#### **Test Specifications** 3 Fuel Injection Pumps 2 NPP 001/4 MAN 17,4 b and Governors

1. Edition

PE 10 P 1104520/5 LS 850

RQ 750 PA 404-3

supersedes-

company: MAN

D 2540 MTE

235 kW (320 PS)

Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke (2.95-3.15)

= RW 9,0-12,0 mm

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	12,9+0,1	15,2-15,4	0,4(0,8)			
250	6,9-7,1	1,1-1,7	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

**B. Governor Settings** 

	hecking of slider  Full-load speed regulation  RG check  Test specifications						Idle speed regulation Setting point Test specifications (5)						
revimir:	Control rod travel mm	1	Control red travel rnm 4	Cantrol red travel rmm	rev/min	rev/min 7	Control red travel mm 8	rev/min 9	Control rod travel nim		Control rod travel mm		
•	•	•	-	11,9 6,6 900	750-755 780-790 0 - 1,0	-	•	-	-	•	•		

750-755 min 1

rod travel

C. Settings for Fuel Injection Pump with Fitted Governor

	stivery on ontrol lever op. 40°C (104°F)	Control rod stop 3a	Fuel delive	ary characteristics 36	Starting fuel delivery 6		
revirue	cm <sup>3</sup> /-1000 strokes	rev/min 3	rev/min	cm³/~1000 strokes 5	rgv/mun 6	cm <sup>3</sup> /1000 strokes / non 7	
700	152,0-154,0 (149,0-157,0)	•	-	•	100	19,5-21,0	

WPP 001/4 MAN 11,1 q 10 1. Edition

PES 6 P 110 A 720 LS 375

RO 750 PA 638

Komb.-Nr. 0 402 046 237

supersedes\_

company: MAN

D 2566 MTE 147 kW

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at prestroke

Testoil-ISO 4113

(2.95-3.15)

mm (from BDC)Zyl. 6 = RW 9,0 - 12,0 mm

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Oifference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	12,5+0,1	15,6-15,8	0,4 (0,8			
250	6,7-6,9	1,0-1,6	0,4 (0,7)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checking PRG che	g of slider ck	Full-load s Setting po		•	cifications (4)	Idle speed regulation s (4) Setting point   Test specifications (5)			Torque control 3		
1 . 1	Control rod travel mm	rev/mwn 3		Custrel red travel mm 5	revimus 6	rev/min 7	Control red transi rmm 8	rev/min 9	Control rod travel mm	rev/min	Control rod travel mm
-	-	•	•	11,5 4,0 900	750-755 780-790 0-1,0	•	•	•	•	-	-

Torque-control travel on flyweight assembly dimension a =

Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	pairvery on control lever pp 40°C (104°F)	Control rod stop 3	Fuel delivi	3	Starting fuel delivery idle speed  Control Test/Min Contr		
r <del>go/mm</del>	cm³/-1000 strokes 2	rev/min	rev/mm	cm <sup>3</sup> /~1000 strokes 5		rev/min	CHECK MECONELY MARS FIRM W
700	156,0-158,0 (153,0-161,0)	•	-	-		100	19,5-21,0

Checking values in brackets

WPP 001/4 MB 16,0c

7. Edition

PE 10 P 100 A 320 LS 811 RQ 300/1250 PA 187 R

Daimler-Benz company: OM 403

$$1 - 8 - 7 - 6 - 3 - 5 - 2 - 10 - 9 - 4$$
 engine:  
 $0 - 27 - 72 - 99 - 144 - 171 - 216 - 243 - 288 - 315^{\circ} - 0.5^{\circ} (-0.75^{\circ})$ 

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

0 401 849 133

A. Fuel Injection Pump Settings

Port closing at prestruke

Testoil-ISO 4113

3,40-3,50

mm (from BDC) Zyl. 10

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Orifference cm³/ 100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
1250 300	10,1 <sub>.0</sub> ,7,4-7,6	1,8 - 2,4	0,3(0,6) 0,3(0,5)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

	thecking of slider TRG check Control rod Full-foad sp		nt	•		Idle speed regulation Setting point   Test specifications   Control rod			Torque control  Control rod		
rev/min 1	travel mm 2		red travel mm 4	red travel mm 5	rev/min 6	rev/min 7	ned travel mm 8	rev/min	travel	rev/min 11	travel
650	13,8-14,6	650	14,2	9,1 4,0 1450	1295-1310 1335-1365 0 - 1,0		7,5	300	min. 9,0 7,4-7,6 445=2,0		10,1-10,2 10,1-10,3

Torque-control travel

Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

governor o	letivery on control lever np. 40°C (104°F)	Control rod stop	Fuel deliv	ery characteristics 36	Starting fuel delivery Idle speed		
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes/ mm	
1250	100,0 - 102,0 ( 98,0 - 104,0)	600	600	77, 0 - 82, 0 (75, 0 - 84, 0)	100	110 - 130	

hecking values in brackets

WPP 001/4 MB 10,8m 1 1. Edition

PE6P100A720RS5

RO 250/1100 PA 9 DR

Daimler-Benz

OM 355

154,5 kW (210 PS)

Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Rump Settings

Port closing at prestroke

(2,75-2,95)

mm (from BDE) RW 9,0-

12,0 mm

Rotational speed rev/min 1	Control rod ravel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /150 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1090	12,0+0,1	9,9-10,1	0,3(0,6)			
250	7,9-8,1	1,7-2,3	0,3(0,5)			

Adjust the fuel delivery from each outlet according to the values in

**B.** Governor Settings

PRG che	g of slider	Setting po		ed regulation   Idle speed regulation   Test specifications (5)				cifications (E)	Torque control  3		
	Control rod travel	rev/min	Control red travel mm	Central red travel rnm 5	rev/min	rev/min	Control red travel		Control rod travel mm	rey/min	Control rod travel mm
600	15,6-16,4	600	16,0		1145-1160 1185-1215 0 - 1,5	t .	6,0	250	min.7,5 5,9-6,1 25= 2,0	1090 450 700	12,0-12,1 12,6-12,7 12,4-12,6
									_ 1	a	

Torque-control travel on flyweight assembly dimension a =

Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	elivery on ontrol lever p. 40°C (104°F)	Control rod stop 3a	Fuel deliv	ery characteristics	14 N	Starting fuel delivery		
rev/min	cm³/~1000 strokes	rev/min 3	rev/min	cm³/-1000 strokes	- 1	rev/min 6 100	cm <sup>3</sup> /1000 strokes / mm	
1090	99,0-101,0 (97,0-103,0)		450	88,0-92,0 (86,0-94,0)		100-	150,0-170,0	
			700	98,0-102,0 (96,0-104,0)				

Checking values in brackets

2.83

G10 **BOSCH** 

# **Test Specifications** Fuel Injection Pumps 2 WPP 001/4 MB 11,4 r and Governors

1. Edition

PES 6 P 110 A 820 LS 459

Komb.-Nr. 0 402 046 248

RQ 350/1050 PA 655

supersedes

companyDaimler-Benz engine: OM 407 h

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Tectoil 150 4113

mm (from BDC)Zy1. 6

Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> / 100 strokes	Control rod travel	Fuel delivery  cm <sup>3</sup> /100 strokes	Spring pre-tensioning (torque-control valve)
9,5-9,6	9,9-10,1	0,4(0,8)	2	3	6
6,6-6,8	1,4-2,0	0,4(0,7)			
	travel mm 2 9,5-9,6	travel mm cm³/100 strokes 2 3 9,5-9,6 9,9-10,1	travel cm³/100 strokes cm³/ 100 strokes 2 3 cm³/ 100 strokes 4 cm³/ 10	travel   tra	travel   travel   travel     travel     cm³/100 strokes   2   3     (0,8)

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Checkin PRG che	g of slider	Full-load s Setting po		_	cifications (4)	Idle spec	-		cifications (5)	Torque d	control 3
rev/min	Control rod travel mm	rev/min 3	Control rod travel mm 4	Control red travel rom 5	rev/min 6	rev/min 7	Control rod travel		Control rod		Control rod travel mm
600	13,1-13,9	600	13,5		1095-1100 1145-1175 0 - 1,0		6,7	350	min. 8,1 6,6-6,8 10 = 2,0	1050 900 600	9,5-9,6 9,7-9,9 10,3-10,5

Torque-control travel on flyweight assembly dimension a Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

governor	delivery on control lever mp 40°C (104°F)	Control rod stop 3a	Fuel deliv	ery characteristics	Starting f	uel delivery
rev/min	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min	cm <sup>3</sup> /-1000 strokes	rev/min	od travel cm <sup>3</sup> /1000 strokes / mm
1050	99,0-101,0 (96,0-104,0)	-	600	90,0-94,0 (87,0-97,0)	100	130,0-150,0

Checking values in brackets

WPP 001/4 MB 8,3 c 4 2. Edition

PE 6 A 90 D 410 RS 2124

RQ 300/1250 AB 812 DL

company: Daimler-Benz

**OM 360** 

141 kW (192 PS)

Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings 2,15-2,25
Port closing at prestroke (2, 10-2, 30) mm (from BDC)

Rotational speed rev/min	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1250	10,2+0,1	8,6 - 8,7	0,3 (0,45			
300	6,3-6,5	1,2 - 1,8	0,2 (0,4)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

rev/min mm r	rev/min mi travel	USUD CONTRACT (MAT)	r <del>ev</del> /min		तानी प्राप्तानी				
1 2 3		5	6	rev/min 7	mm 8		travel mm 10		travel mm 12
700 15,6-16,4	700 16,0	9,2 4,0	1295-1310 1345-1375		6,4	300	min.7,9 6,3-6,5 10 = 2,0 max.1,0	-	•

Torque-control travel on flyweight assembly dimension a =

1295-1310 min Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	elivery on control lever np. 40°C (104°F)	Control rod stop	Fuel deliv	ery characteristics	-	Starting fuel delivery Idle speed		
rev/min	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5		rev/min 6	red travel cm <sup>3</sup> /1000 strokes/ mm 7	
1250	86,0-87,0 (84,0-89,0)		800	80,0-83,0 (78,0-85,0)		100	19,0-21,0 mm RW	

Checking values in brackets

WPP 001/4 BAO 10,6 a
1. Edition

En

PES 4 P 120A 320 RS 451

RQV 350-900 PA 618

supersedes

company:Baudouin

engine: 107 kW (145 PS)

Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

2.75-2.95)

mm (from BDC)

Rotational appead rev/min 1	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (forque-control valve) mm 6
900	11,0+0,1	17,6-18,0	0,5(0,8)	,		]
350	7,2-7,4	2,2-2,8	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated s	peed		Intermediate	ce belan	beed	Lower rated	speed		Sliding s	leeve travel
deflection	rev/min Control	Control rod (a) travel	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel		1
	rod travel	rev/min 2a	of control	rev/min		of control lever	rev/min	mm ③	rev/min 10	mm 11
1	2	3	<u>-</u>	5	6	<u> </u>	•	9	10	- ' '
max.	940	15,2-17,8	-	-	-	ca. 30		min. 8,8 7,2-7,4	300 500	0,7-1,0
	10,0 4,0 1150	940-950 990-1020 0 - 1,0				350-440			700 900	5,5=5,9 8,0
	2200	1,0				39				

Torque control travel a =

mr

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-ros Test oil ten		Rotational-speed 20 limitation intermediate speed	Fuel delivingh idle s	ery characteristics (Sa)	Starting Idle switchin	9	Torque- travel	Control rod
rev/min	cfk <sup>3</sup> /1000 strokes .	rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	trav <b>e</b> l mm
1	2	3	4	5	6	7	8	9
900	176,0-180,0 (173,0-183,0		1	•	-	-	•	•

Checking values in brackets

\* 1 ភាពា less control rod travel than col. 2

WPP 001/4 0MB 8,1d 2.Edition

Testoil-ISO 4113

PES 6 MW 100/720 RS 1012 0 403 446 127 RQV 425-1100 MW 36

supersedes 82

companyOM-Brescia engine: 8365.25.580 129 kW (175 PS)

1 - 5 - 3 - 6 - 2 - 4

 $0 - 60 - 120 - 180 - 240 - 300 \pm 0,5(0,75)$ 

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Rotational speed rev/min	Control rod travel mm	(2,85-3,05) Fuel delivery cm³/100 strokes	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
1100	11,5+0,1	9,6 - 9,8	0,35(0,6)			_
425	5,8-6,0	1,15 - 1,55	0,35(0,55			
700	12:4+0,1		0,5 (0,7)			
500	11,2+0,1		0,35(0,5)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated s	peed		Intermediate	rated sp	<del>ee</del> d	Lower rated	speed		Sliding sleeve travel	
Degree of deflection of control	rev/min Control rod travel	Control rod travel mm rev/min 28	of control	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel	rev/min	mm (1)
lever 1	mm 2	rev/min (28	lever 4	5	6	7	8	9	10	11
max.	1100	15,2-17,8	-	-	-	ca. 14	425	5,8-6,0		
	1300	0 - 1,0					100	min.7,5		
ca.49	10,5	1140-1150					470-	530= 2,0		
	4,0	1185-1215				39				

Torque control travel a =

mn

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc Test oil terr		Rotational-speed 20 timitation stermediate speed	Fuel delivingh side s	need (a)	Starting lidle switchin		Torque- travel	control (5) Control rod travel	
rev/mirs	c/h³/1000 strokes	A lugaria status		rev/min	cm <sup>3</sup> /1000 strokes	LGA/LUNU	mm		
1	2	3	4	5	6	7	8	9	
LDA	0,5 bar		LDA	0,5 bar			700	12,4+0,	
1100	96,0-98,0 (94,0-100,0)	1140 - 1150 *	700	101,0-105,0 (99,0-107,0)		RW max.19 min.160,0	1000	11,5+0,	
			LDA	0 bar	İ				
			500	75,0-77,0 (73,0-79,0)	100-2	20 (80-240)			

Checking values in brackets

\*1 mm tess control rod travel than col 2

## D. Adjustment Test for Manifold Pressure Compensator

estatn = 500	/min id <b>XXXXXXXX</b> pres	isure – in bar gauge pressure XXXX	0MB 8.1 d -2					
Pump/governor	` 1g							
	Gauge pressure =	bar Gauge pressure =	bar mm (1)					
RS 1012 +	0,27		12,1 - 12,2					
RQV-MW 36		0,2	11,5 - 11,7					
		0,5	12,4 - 12,5					
·		0	11,2 - 11,3					

Notes.

(1) when n =

rev/min and gauge pressure = bar (= maximum full-load control rod travel)

# **estoil-ISO 4113**

0

#### **Test Specifications** Fuel Injection Pumps 1 WPP 001/4 MAN 20,9c and Governors 3. Edition

PE 12 P 120 A 520 LS 836

R0V250-1150PA353R

O8 afferraque

compaMAN

12 - 1 - 5 - 9 - 8 - 3 - 4 - 11 - 10 - 2 - 6 - 7

engine:D2542MLE

0 - 45 - 60 - 105 - 120 - 165 - 180 - 225 - 240 - 285 - 300 - 345 - 0,5 (±0,75°) 478,0 (650 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings 3,00-3,10

FOR COMING AL PINE	SCORE	2.95-3.15	mm (from BDC)		Zy1. 12					
Rotational speed rev/min		Fuel delivery  cm <sup>3</sup> /100 strokes	Difference cm³/ 100 strokes	Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (torque-control valve)				
1150	11,3-11	4 18,5 - 18,8	0,5(0,9)		3					
250	6,7-6,9	2,2 - 2,8	0,8(1,2)							

Adjust the fuel delivery from each outlet according to the values in [

#### **B.** Governor Settings

Upper rated s	peed		Intermediate	rated sp	eed	Lower rated	apeed		Stirling stages beyond	
deflection	rev/min Control rod travel	Control rod travel	Degree of deflection of control		Control rod travel	Degree of deflection of control	lection travel		Sliding sleeve trav	
lever 1		rev/min (2a)	lever 4	rev/min 5	mm <b>(</b>		rev/min	mm 3	rev/min 10	mm 11
±ax.	1150	15,2-17,8	•	-	•	ca.11	100	min.8,3	200	0,6-0,9
	1450	0 - 1,0					250	5,7-6,9	830	3,2-3,7 5,7-6,0
ca.66	10,3	1190-1200					520-5	80 =2,0	1150	8,1
	4,0	0 - 1,0				<b>③</b>				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-roi Test oil ten		Intermediate speed		Starting idle switching	. 0	Torque- travel	control (5)	
rev/min	cfh³/1000 strokes .	rev/min 40	rav/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	mm
1	2	3	4	5	6	7	8	9
1150	185,0-188,0 (182,0-191,0)				100 100-	200,0-220,0 170 (80-190)		

Checking values in brackets

\* 1 mm less control rod travel than col. 2

2.83

BOSCH

Geschäftspereich KM: Kundendienst, Kfz-Ausrustung. 5 by Robert Bosch GmbH, D-7 Stuttgart 1. Posifisch 50. Printed in the Federal Republic of Germany Imprime en Republique Federale d'Allemagne per #: bert Bosch GmbM.

WPP 001/4 BAO 13,2 a

1. Edition

PES 5 P 120 A 320 RS 452

RQV 350-900 PA 618

1 - 2 - 4 - 5 - 3 je  $72^{\circ} \div 0.5^{\circ} (\div 0.75^{\circ})$ 

company Baudouin
BNP 5
132 kW

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

(2,75-2,95) Port closing at prestroke mm (from BDC) Control rodi Rotational apad Control rod Fuel delivery Difference **Fuel delivery** Spring pre-tensioning (torque-control valve) cm<sup>3</sup>/100 strokes 100 strokes cm<sup>3</sup>/100 strokes rev/min 0.5(0.8)900 11,0+0,1 17,6-18,0 350 7,2-7,4 2,2-2,8 0.8 (0.7)

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Testoil-ISO 4113

Upper railed s	peed		Intermediate	rated ap	eed	Lower rated	speed		Stiding	Jeeve travel
deflection	rev/min Control	travel 🕒	Gemection		Control rod travel	Degree of deflection		Control rod travel		0
of control	unu Log passe	rev/min 2a	of control lever	rev/min	mm ④	of control lever	rev/min	mm 3	rev/min	mm
1	2	3	4	5	6	-	8	9	10	11
max.	940	15,2-17,8	-	-	-	ca.30	100	min.7,5	300	0,7-1,0
ca.59	10,0	940-950					350	7,2-7,4		3,1-3,8
	4,0	990-1020				350-440			700 900	5,5-5,9 8,0
	1150	0-1,0				330-440			300	0,0
Ĭ							}			
						<b>②</b>				

Torque control travel a =

mn

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ten		intermediate speed	hgh die s	ery characteristics (5e)	Starting Idle awitching	•	Torque-control 5 travel  Control roc		
rev/min	crit <sup>3</sup> /1000 strokes	rev/min 4e	rav/min	cm³/1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/mun	travel mm	
900	176,0-180,0 (173,0-183,0		-	-	100	19,5-21,0 mm RW	-	-	

Checking values in brackets

\* 1 mm less control rod travel than col 2

WPP 001/4 MAN 20,9 q

1. Edition

PE 12 P 110 A 520/4 LS 848

RQV 250-1200 PA 644

supersedes

companyMAN

engine: D 2842 ME

1- 5- 9- 8- 3 - 4 - 11- 10- 2 - 6 - 7 - 12 G-15-60-75-120-135-180-195-240-255-300-315° -0,5° (-0,75°)

338 kW

All test specifications are valid for Boach Fuel Injection Pump Test Banches and Testers

Komb.-Nr. 0 401 840 078

#### A. Fuel Injection Pump Settings 3.0-3.1

Port closing at pres	stroke	(2 95-3 15)	mm (from BDC)	vl_12		
Rotational speed		Fuel delivery	Difference cm <sup>3</sup> /	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm .	cm <sup>3</sup> /100 strokes	100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
1200	11,9+0,1	12,5-12,7	0,4(0,8)			
250	7,0-7,2	0,9-1,5	0,4(0,7)			
				Ī		

Adjust the fuel delivery from each outlet according to the values in [

#### **B. Governor Settings**

Upper rated s	peed			Intermediate	rated sp	ed.		Lower rated	speed			Sliding s	leeve travel
deflection	rev/min Control rod travel	Control rod travel mm	<b>①</b>	Degree of deflection of control		Control n	od _	Degree of deflection of control		Control re travel	xd		0
	mm	rev/min	<b>②</b>	lever	rev/min	mm	•	lever	.ea/wiu	mm	3	rev/min	mm
1	2	3		4	5	6		7	8	9		10	11
max.	1230	15,2-17,	8	-	-	-		ca.12		min.8, 7,0-7,		315 950	,6-1,9 5,1-5,3
ca. 61		1240-125 1365-139						425-550	250	,,,,		1200	7,5
								<b>③</b>					

Torque control travel s

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ten				Starting Idle switchin	<u> </u>	Torque- travel	control 5	
rev/min	cm³/1000 strokes	rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	mm
1	3	3	4	5	6	7	8	9
1200	125,0-127,0 (122,0-130,0)		-	-	100	150,0-170,0 (146,0-174,0)	-	•

Checking values in brackets

\* 1 mm less control rod travel than col. 2

2.33

G18 BOSCH

Testoil-ISO 4113

WPP001/4 KHD 4,7 b 2. Edition

PES 5 A 80 D 410/3 RS 2579 RQV 300-1400 AB 1048 DL

1-3-5-4-2 je 72°  $^{+}0,5^{\circ}$  ( $^{+}0,75^{\circ}$ )

supersedes 9.82

74 kW (101 PS) bei 2800 min

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuei Injection Pump Settings

Port closing at prestroke

Testoil-ISO 4113

(1,85-2,05) mm (from BDC)

Rotational speed rev/min	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 8
1400	11,4+0,	6,1-6,2	0,2(0,35)			
300	8,9-9,	1,0-1,6	0,2(0,3)			

Adjust the fuel delivery from each outlet according to the values in [

#### **B. Governor Settings**

Upper rated s	peed		Intermediate	rated sp	eed	Lower rated	speed		Slidina s	leeve travel
deflection	rev/min Control rod travel mm	Control rod travel mm rev/min 2s	Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel mm 3	rev/min	TIMM
1	2	3	4	5	6	7	8	9	10	11
max.	1400	15,2-17,8	-	-	-	ca.10	100 300	min.7,5 5,9-6,1	250 630	0-0,6 2,9-3,1
ca. 60	10,4 4,0 1850	1480-1490 1710-1740 0-1,0				390-490		max. 1,0		5,0-5,3 5,9
						<b>3</b>				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-roo Test oil ten		Imitation intermediate speed	Fuel delivery characteristics 5a high idle speed 50		Starting Idle switchin		Torque- travel	control 5  Control rod travel
rev/mm	cm³/1000 strokes .	rev/min 40	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	mm
1	2	3	4	5	6	7	8	9
1400	62,5-63,5 (61,0-65,0)	1480-1490*	900 750	59,5-61,5 (57,5-63,5) 56,5-58,5 (55,0-60,0)		120,0-130,0 bei 20,5-21,9 mmRW	1075 825	11,4+0, 11,5+0, 12,0+0, 12,4+0,

Checking values in brackets

\* 1 mm less control rod travel than col. 2

WPP 001/4 PEN 10,0 d 1 1. Edition

PE 6 P 110 A 320 RS 138

RSV 200-900 P 1/305 R

supersedes

Komb.-Nr. 0 401 876 104

Volvo-Penta MD 100 B 114 kW (155 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Testoil-ISO 4113

(2,55-2,75)

mm (from BDC)

Control rod travel	Fuel delivery	Difference cm <sup>3</sup> /	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
mm (2)	cm <sup>3</sup> /100 strokes	100 strokes	mm.	cm <sup>3</sup> /100 strokes	mm
2	3	4	2	3	6
9,3-9,4	10,9-11,1	0,4 (0,8)			
5,4-5,5	1,0-1,4	0,3 (0,6)			7
			1		
-			İ		
	travel 2 2 9,3-9,4	travel mm 2 cm <sup>3</sup> /100 strokes 3 9,3-9,4 10,9-11,1	travel mm 2 cm <sup>3</sup> /100 strokes cm <sup>3</sup> / 9,3-9,4 10,9-11,1 0,4 (0,8)	travel	travel mm 2 cm <sup>3</sup> /100 strokes   cm <sup>3</sup> / 100 strokes   mm   cm <sup>3</sup> /100 strokes   mm   cm <sup>3</sup> /100 strokes   3   9,3-9,4   10,9-11,1   0,4 (0,8)

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

1 1 1	rated speed		Intermed	hate rated	speed	<b>①</b>		rated speed Control rod	Torque control		
Degree of deflection of control	travel mm	Control rod travel mm rev/min				Control- lever deflection	rev/min	travel mm	rev/min	travel	
lever 1	2	3	4	5	6	in degrees 7	8	9	10	11	
loose	800	0,3-1,0	-	-	-	ca. 23	225	5,0	-	•	
	x =	6,0					100 225	min.20,0 5,4-5,5			
ca.48	8,3 4,0 1100	940-950 970-1000 0,3-1,7					310-370				

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

	emp. 40°C (104°F) cm³/1000 strokes 2	Rotational- speed limitat Note: changed to .) rev/min 3		el delivery aracteristics cm <sup>3</sup> /1000 strokes 5	Starting fi Idle rev/rmn 6	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm
700	109,0-111,0 (106,0-114,0)	940-950*	-	•	100	310,0-330 = RW 20,0 21,0 mm		-

Checking values in brackets

1 mm less control rod travel than col. 2

3.83

haftsbereich KM. Kundendienst. Kfz-Ausrustung. 50 by Robert Bosch GmbM. Postlach 50, D-7000 Stuttgart 1. Printed in the Federal Republic of Germany me en Republique Federale d'Allemagne par Robert Bosch GmbM.

WPP 001/4 VAL 3,3a

2. Edition

En

PES3A95D 320 RS 2655

RSV 325-1150 A 2 B 2178-1R

supersedes 11.82
Valmet
company 311 DS 6

1 - 2 - 3 je 120 •  $\frac{1}{2}$  0,5 • ( $\frac{1}{2}$ 0,75 •)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

Testoil-ISO 4113

(2,45-2,65)

mm (from BDC

Rotational speed rev/min	Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes 3	Cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm-//100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1150	10,0+0,1	8,3 - 8,5	0,3 (0,6)			
325	7,0-7,2	0,9 - 1,5	0,3 (0,5)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Degree of deflection of control lever	r rated speed Control rod travel mm	rev/min Control rod travel mm rev/min	Intermed	hate rated	speed	Control- lever deflection in degrees 7		rated speed Control rod travel mm	11 0 1	rque control Control rod travel mm
loose	800 X = 6,	0,3-1,0	-	-	-	ca. 28	100	6,7 min.19,5	1150 500	10,0-10,1
ca. 54	4,0	1190-1200 1290-1320 0,3 -1,7					325 650-710	7,1-7,3 = 2,0	915	10,6-10,8

The numbers denote the sequence of the tests

### C. Settings for Fuel Injection Pump with Fitted Governor

(29)	ill-load stop	6 Rotational- speed limitat	33 Fu	Fuel delivery characteristics		uel delivery (5)	da idle stop	
Test oil te rev/min 1	emp 40°C (104°F) cm <sup>3</sup> /1000 strokes 2	Note. changed to) rev/min 3	rev/min	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min	travel mm 9
1150	82,5-84,5 (80,5-86,5)	1190-1200•	500	83,0-86,0 (81,0-88,0)	100	171,0 - 181,0 = 19,5-21,5 mm RW	-	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

3.83

BOSCH

Geschaftsbereich KH. Kundendienst. Kfz-Ausrustung  $\varsigma$  1980 by Robert Bosch GmbH. Postfach 50, D-7000 Stuttgart 1. Printed in the Federal Republic of Germany imprime en Republique Federale d. Allemagne par Robert Bosch GmbH.

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WPP 001/4 PEN 10,0 b 1 1. Edition

En

PE 6 P 100 A 320 RS 101 y

RSY 200-900 P 4/305 R

Komb.-Nr. 0 401 876 263

volvo-Penta volvo-Penta company TD 100 A/PP engine 154 kW (209 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

Testoil-ISO 4113

(2.55-2.75)

mm (from BDC7 RW 9,0 - 12,0 mm

Rotational speed	Control rod	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm (2)	cm <sup>1</sup> /100 strokes	cm <sup>3</sup> / 100 strokes 4	mm 2	cm <sup>2</sup> /100 strokes	mm 6
700	12,0+0,1	13,6 - 13,8	0,3(0,6)			
200	5,5-5,7	1,1 - 1,5	0,2(0,5)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

	r rated speed		Intermed	diate rated	speed	(1)		rated speed	(3)	rque control
Degree of deflection	Control rod travel	Control rod travel				Control- lever		Control rod travel		Control rod travel
of control	mm	mm rev/min				deflection in degrees	rev/min	mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
loose	800	0,3-1,0	-	-	-	ca. 18	200	5,1	· <b>-</b>	-
10030	Х =	= 4,0					100	min.20,0		
			l				200	5,5-5,7		
ca. 51	11,0	940-950					260-320	= 2,0		
28	4,0	970-1000								
	1135	0,3-1,7								L

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

	N-load stop	Rotational- speed limitat	<b>3</b> € Fu	el delivery aractenstics	Starting f	uel delivery 5	da Idle stop	
rev/min	mp 40°C (104°F) cm-/1000 strokes 2	changed to 3 rev/min 3	rev/min	cm <sup>3</sup> /1000 strokes 5	rev/min	cm <sup>2</sup> /1000 strokes 7	rev/min	travel mm
700	136,0-138,0 (133,0-141,0)	940-950 *	-	-	100	230,0-260	,0 -	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

3.83

BOSCH

Geschaftsbereich KH. Kundendienst. Kfz-Ausrustung. 5 1980 by Robert Bosch GmbH. Postfach 50: D-7000 Stuttgart 1. Printed in the Federal Republic of Germany Imprime en Republique Federale d'Allemagne par Robert Bosch GmbH.

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WPP 001/4 MWM 14,4 a 1
1. Edition

Εn

PE 8 P 120 A 520/5 RS 427 RSUV 300-750 P 10 A 320

supersedes: MMM company D 234-V 8

1- 8-5 -4 - 7 - 2 - 3 - 6 0-30-90-120-180-210-270-300 ° + 0,5 ° (+ 0,75 °)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

Testoil-ISO 4113

2,0-2,3 2,75-2,95)

mm (from BDC)

Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
9,7-9,8	17,1-17,5	0,5 (0,9)			
6,5-6,7	2,8-3,6	0,8 (1,2)	٠		
	travel (2) 2 9,7-9,8	travel cm-1/100 strokes 3 9,7-9,8 17,1-17,5	travel cm <sup>3</sup> / <sub>2</sub> cm <sup>3</sup> / <sub>3</sub> cm <sup>3</sup> / <sub>100</sub> strokes cm <sup>3</sup> / <sub>100</sub> strokes 4  9,7-9,8 17,1-17,5 0,5 (0,9)	travel  mm 2 cm <sup>3</sup> /100 strokes cm <sup>3</sup> / 2 9,7-9,8 17,1-17,5 0,5 (0,9)	travel  mm 2 cm <sup>3</sup> /100 strokes 3  100 strokes 4  100 strokes 2  17,1-17,5  100 strokes 2  100 strokes 2

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Degree of deflection	rated speed Control rod travel mm	rev/min Control rod travel mm rev/min	Intermed	liate rated	speed 6	Control- lever deflection in degrees 7	Lower rev/min 8	rated speed Control rod travel mm	3 To	rque control Control rod travel mm
loose	800 x =	0,3-1,0 2,75	-	٠	•	ca.21	300 300	6,1 6,5-6,7	750 450 320	9,7-9,8 9,7-9,8 10,9-11,5
ca. 55	8,7 4,0 950	790-8 0 800-830 0,3-1,7					320-38	0 = 2,0		

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

20	H-load stop emp 40°C (104°F)	6 Rotational- speed limitat		el delivery aractenstics	Starting I	uel delivery 5	4a) idi	e stop  Control rod
rev/min	cm <sup>2</sup> /1000 strokes	changed to ) rev/min 3	rev/min	cm <sup>3</sup> /1000 strokes 5	rev/min	cm <sup>3</sup> /1000 strokes	s rev/min	travel mm 9
750	171,0-175,0 (168,0-178,0)	790-800*	-	•	100	19,5-21, mm RW	0 -	

Checking values in brackets

\* 1 mm less control rod travel than col. 2

1.83

**BOSCH** 

# **Test Specifications** Fuel Injection Pumps (A) HPP 001/4 MB 11,4 1 6 and Governors

1. Edition

PES 6 P 110 A 820 LS 442-1

RSV 350-1100 P 0/485

Supersede Daimler-Benz company OM 407 177 kW (241 PS)

Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

3,2 - 3,3 (3,15-3,35)

mm (from BDC)

Rotational speed rev/min t	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
1100 350	11,7+0,1 7,8-8,0	12,5-12,7	0,4 (0,8) 0,4 (0,7)			

Adjust the fuel delivery from each outlet according to the values in [

#### **B.** Governor Settings

	rated speed Control rod travel mm		Intermed	iate rated	speed	Control- lever deflection in degrees 7		rated speed Control rod travel mm	1 2	rque control Control rod travel mm
loose	800 ×	0,3-1,0 = 3,0	-	-	-	-	-	-	-	-
ca. 48	10,7 4,0 1250	1140-1150 1220-1250 0,3-1,0								

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

(29)	ulf-load stop emp 40°C (104°F)	Rotational- speed limitat		nel delivery naracteristics	Starting I	tuel delivery (5)	(4)	e stop
rev/min	cm <sup>3</sup> /1000 strokes	changed to ) rev/min 3	rev/min	cm <sup>3</sup> /1000 strokes 5	rev/min	cm41000 strokes	rev/min 8	travel mm 9
1100	125,0-127,0 (122,0-130,0)	††40 <del>-</del> 1†50*	600	117,0-121,0 (114,0-124,0)	100	140,0-160	,0 -	-

Checking values in brackets

\* 1 mm less control rod travel than col 2

Geschaftsbereich KH. Kundendienst. Kfz-Ausrustung. < 1980 by Robert Bosch GmbH. Postfach 50. D-7000 Stuttgart 1. Printed in the Federal Republic of Germany Imprime en Republique Federale d'Allemagne par Robert Bosch GmbH.

WPP 001/4 DAF 11,6 D 1. Edition

PE 6 P 120 A 320 RS 443

RSV 250-1100 P 5/458 R

supersed® DAF

DKS 1160 235 kW (320 PS)

See service Information VDT-I-DAF 004

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Testoil-ISO 4113

2,8 - 2,9 (2,75 - 2,95)

Rotational speed rev/min	Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>1</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
850	10,9+0,1	19,1-19,5	0,5(0,9)			_]
250	6,2-6,4	1,1-1,5	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Degree of	rated speed Control rod		Intermed	hate rated	speed	Control-		rated speed Control rod travel	1 5	rque control Control rod travel
deflection of control lever	mm 2	mm rev/min	4	5	6	lever deflection in degrees 7	rev/min 8	<b>mm</b> 9	rev/min 10	mm 11
loose	800	0,3-1,0	-	_	_	ca. 24	250	5,8	400	11,1-11,2
	x =	- 0					250	6,2-6,4	300	11,3-11,8
ca. 54	9,9 4,0 1425	1140-1150 1260-1290 0,3-1,7					620-680	= 2,0		

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

	Full-load stop est oil temp 40°C (104°F)	6 Rotational- speed irritat	11-341	iel delivery paracteristics	Starting f	uel dekvery 5	da Idle stop		
rev/min	cm <sup>3</sup> /1000 strokes	changed to )		cm3/1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes		travel mm 9	
LDA 850	0,7 bar 191,0-195,0 (188,0-198,0)	1140-1150*	LDA 600	0 bar 133,0-137,0 (130,0-140,0)	100	315,0-355 = 19,5 - 21,0 mm RM		•	

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Bosch Geschaftsbereich KM. Kundendienst. Kfz-Ausrustung.

2. 1980 by Robert Bosch GmbM. Postfach 50, D-7000 Stuttgart 1. Phinted in the Federal Republic of Germany Imprime en Republique Federale d'Allemagne par Robert Bosch GmbM.

### D. Adjustment Test for Manifold Pressure Compensator

DAF 11,6 p

. 2 -

Test at n =

600

rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 6 PRS 443 + RSVP 5/458 R	0,36	0,70 0 0,28	10,6 - 10,7 10,9 - 11,0 9,8 - 9,9 10,0 - 10,2

Notes:

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

WPP 001/4FOR 5,9 f 2

En

PES 6 A 90 D 210 RS 2629

RSV 350-1300 A0B 2143 L

supersedes
company
Ford
pover 363

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings to port closing the locating pin must engage in the 2,7-2,8

Port closing at prestroke(2,65-2,85)

mm (from BDC) the pointer.

Rotational speed rev/min	Control rod travel	Fuel delivery cm <sup>1</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes	Spring pre-tensioning (torque-control valve) mm 6
1250	11,7+0,1	5,9-6,0	0,3(0,45			
350	7,2-7,4	0,7-1,3	0,2(0,4)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

1 Uppe	r rated speed	rev/min	Intermed	diate rated	speed	(4)	Lower	rated speed	(3) to	rque control
Degree of deflection	Control rod travel	travel				Control- lever		Control rod travel		Control rod travel
of control lever 1	mm 2	mm rev/min	4	5	6	deflection in degrees 7	rev/min 8	9 mm ·	rev/min	11
loose	800	0,3-1,0	-	-		ca. 40	350	6,8	1250	11,7-11,8
	x =	3,5					100	min.19,0	700	11,9-12,0
ca.71	10,7 4,0 1680	1370-1380 1515-1545 0,3-1,7					350 580-64 700	7,2-7,4 0 = 2,0 max. 1,0	·	

The numbers denote the sequence of thr. tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

9	il-load stop	Rotational- speed imitat  3 Fuel delivery characteristics			Starting f	uel delivery 5			
Test oil te rev/min	cm-/1000 strokes	Note changed to ) rev/min 3	revimin	cm <sup>3</sup> /1 <b>000</b> strokes 5	rev/min	cm-/1000 strokes	rev/min 8	Control rod travel mm _ 9	
1250	58,5-59,5 (56,5-61,5)	1370-1380*	•	-	100	19,5-21,0 mm RW	-	-	

Checking values in brackets

\* 1 mm less control rod travel than col. 2

2.83

**BOSCH** 

Geschaftsbereich KH: Kundendienst: Kfz-Ausruskling < 1980 by Robert Bosch GmbH: Postfach SO: 0-7000 Shittgart 1: Phinted in the Federal Republic of Germany

Western Complete Existing & Allemanton per Britant Bosch GmbM.

Testoil-ISO 4113

WPP 001/4 MB 18,3 d

2. Edition

Testoil-ISO 4113

0

PE 10 P 110 A 320 LS 3818

RQV 300-1150 PA 486-2

1 - 8 - 7 - 6 - 3 - 5 - 2 - 10- 9 - 4 0 -27 -72 -99 -144-171-216-243-288-315° - 0,5° (- 0,75°) paimler-Benz company OM 423 engine: 261 kW (355 PS) Komb.-Nr. O 401 849 706

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Rotational speed rev/min	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1150	12,1+0,1	12,5 - 12,7	0,4(0,8)			
300	8,5-8,7	1,4 - 2,2	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in \_\_\_\_

#### **B.** Governor Settings

Upper rated	poed		Intermediate	rated sp	eed	Lower rated	speed		Sirian e	leeve travel
Degree of deflection of control	rev/min Lontrol rod trave	Control rod travel	Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel		0
lever		rev/mun (2s	lever	rev/min	mm (4)	lever	rev/men	mm (3)	LOSA (ALDREA)	mm
1	2	3	4	5	6	7	8	9	10	11
max.	1200	15,2-17,8	_	-	-	ca. 19	100	min.10,2		1,0-1,2
ca. 65	11,1 4,0 1400	1190-1200 1240-1270 0 - 1,0				330-470	300	8,5-8,7		3,4-3,7 4,9-5,3 7,6
						<b>③</b>				

Torque control traval a = 0,5 mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc Test oil terr		Rotational-speed (20) limitation resimediate speed			lde	heal delivery (8) ng point	Torque com	
rov/man	citi <sup>3</sup> /1000 strokes	<u>@</u>		cm³/1000 strokes	-	can7/1000 strokes		-
1150	125,0-127,0 (122,0-130,0)	1190-1200 *	900	115,0-119,0 (112,0-122,0) 116,0-121,0 (113,0-124,0)		130, 0-150, 0		12,1+0 12,5+0 12,4+0

Checking values in brackets

\* 1 mm less control rad travel then cal. 2

3.83

BOSCH

WPP 001/4 MB 16,0 i

3. Edition

PE 10 P 100 A 320 LS 811 RQV 300-1250 PA 227 R 1-8-7-6-3-5-2-10-9-4 0-27-72-99-144-171-216-243-288-315 ° ± 0,5 ° (± 0,75 °)

supersede3.82 company:Daimler-Benz OM 403 Komb.-Nr. 0 401 849 136

All tes; specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Retational speed	Control cod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	cm³/ 100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	:	4	2	3	6
1250	10,3+0,	10,0-10,2	0,3(0,6)			
300	7,4-7,1,	1,8-2,4	0,3(0,5)			7
					1	
		F 1			1	
i		İ		1		

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated	speed		Intermediate	rated ap	900	Lower rated	speed		~	siotro traval
Degree of deflection of control lever	reviews Control rod travel mm	traval (	Degree of deflection of combal lever	1911/min	Control ro travel	Degree of deflection of control lever	revinen	Control rod travel	) reviews	0
1	2	3	4	5	8	7	8	•	10	11
max.	1250	15,2-17,8	-	-	-	 ca. 12		min. 9,0		0,7-1,0 3,4-3,7
ca.66	9,3 4,0 1450	1290-1300 1330-1360 0 - 1,0						7,4-7,6 590 = 2,0		5,2-5,6 8,0
						<b>②</b>				

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rad stop Test oil temp. 40°C (104°F) 2		Rotational speed (20) immission resembles speed	Fuel delinings also	47 CHARLES (S)	Starting Idle switchis		Torque- travel	control (5)
routman	crit <sup>3</sup> /1000 strokes	70-/mm (4)	rgulman 4	cm <sup>3</sup> /1000 strokes	rev/min	cm-V1000 strokes	revitana	Torol 9
1250	100,0-102,0 (98,0-104,0)	1290-1300 *	600	78,0-83,0 (76,0-85,0)	100	120,0-140,0		

icking values in brackets

we less control rod travel then col. 2 2.83

0

Testoil-ISO 4113

Festoll-ISO 4113

# **Test Specifications** Fuel Injection Pumps 1 and Governors

Fiat 13,8k 3. Edition

PE 8 P 120 A 920/5 LS 3804

RM300 -1200 PA 357 R

supersedes2.81 company Fiat 8280.02.183 257 ky (350 PS)

1 - 8 - 4 - 3 - 6 - 5 - 7 - 2 0 -45 -90 -135-180-225-270-315°+0.5° (+0.75°)

All test apacifications are valid for Boach Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings
(3,45-3,65)
Port closing at prestroke
3,50-3,60

Rotational speed	Control rod travel	Firel delivery	Difference cm <sup>3</sup> /	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
r <del>gulmin</del> 1	mm 2	cm <sup>3</sup> /100 strokes 3	100 strokes	min 2	cm <sup>3</sup> /1 <b>00 strokes</b> 3	mm 6
1200	9,3-9,4	17,3 - 17,7	0,5(0,9)			
300	5,9-6,1	2,8 - 3,6	0,8(1,2)			
			<u> </u> _			

ivery from each outlet according to the values in [

#### **B.** Governor Settings

Upper rated t	peed			Intermediate	rated ap	ed .	Lower rated	epeed		Shaina si	loove travel
	Control rod travel	travel '		Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel		0
lever 1	2	r <del>ev/min</del> (	<b>(3)</b>	lever 4	r <del>ov/men</del> 5	mm (4) 6	levar 7	r <del>év/min</del> 8	mm (3) 9	10	mm 11
max.	1200	15,2-17	,8				ca. 10	100 300	min.7,5 5,9-6,1	300 800 1200	5,2-5,
ca. 63	8,3 4,0 1450	1240-12 1315-13 0 - 1	45				340-445 ③				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc Test of ten		Rotational-speed (20) immission intermediate speed	Fuel deli- high idle :	9) Characteristics (9)	1000	fuel delivery 6	Torque-control (stravel	
rey/min	crit <sup>3</sup> /1000 strokes		101/Man	cm <sup>3</sup> /1000 strokes	revious	cm-Y1000 strokes	101/101	travel mm
1200	173,0-177,0 (17 <b>0</b> ,0-180,0				100	19,5-21,0 mm PW		

Checking values in brackets

' 1 mm less control rad trevel then cal. 2

# Testoil-ISO 4113

**回** 

# **Test Specifications** Fuel Injection Pumps 1 PP 001/4 FIA 13,8 m and Governors

Edition

PE 8 P 120 A 920/5 LS 3804

ROV 300-950 PA 475

supersed&1.82 companyFiat 8285.22

1 - 8 - 4 - 3 - 6 - 5 - 7 - 2  $0 - 45 - 90 - 135 - 180 - 225 - 270 - 315 \pm 0,5°(\pm 0,75°)$ 

All that specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

(3,45-3,65) Port closing at prestroke

Rotational speed revirus	Control rad travel mos	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Oifference cm <sup>3</sup> / 100 strokes 4	Control radi traval rum	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
950	11,1+0,	1 202 - 21,1	0,5(0,9)			
300	4,9-5,1	1,5 - 2,1	0,8(1,2)			·

t the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated a	peed	)		Intermediate	rated ap	ed	Lower reted	speed		Siding	doeve travel
deflection		Control rod travel		Degree of deflection		Control radi	Degree of deflection		Control rod	. 0	
	rod travel	Little Common Co	<b>②</b>	of control lever	rev/min	mm ①	of control lever	rev/min	mm 3	rev/men	mm
	•			-	-		<del> '</del>	•	<u> </u>	10	11
sax.	950	15,2-1	7,8	-	-	-	ca.11	100	min.7,5	300	2,0-2,1
ca. 64	10,1	990-10	000					300	5,9-6,1	400	3,1-3,5
	4.0	1075-11						300	-390=2,0	1000	8,3
	1250	0 - 1	,0								
							(3)				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc Test of test		intermediate speed	high iche s	9	Idle	fuel delivery (6) mg point	Torque- travel	Control rod	
rev/mas	c/k³/1000 strokes	rautman 🐵	rew/west	cm³/1000 strokes	-	cmY1000 strokes	rgydraus	Tavel Time	
1	2	3	•	5	•	7	•	•	
LDA 950	0,7 bar 207,0-211,0	990-1000*	LDA 950			19,5-21 mmR			
	(204, 0-214, 0)			(139,0-149,0		Electromagne	t 241		

Chucking values in brackets

\* 1 mm less control rod travel then col. 2

### D. Adjustment Test for Manifold Pressure Compensator

FIA 13,8 m -2-

700	XXXXX		<del></del>
Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
LS 3804 + RQVPA 475	0,7	0,35 0,28 0	11,1 - 11,2 10,4 - 10,5 9,0 - 9,3 8,3 - 8,4

Notes

(1) when n =

bar ( = maximum full-load control rod travel)

WPP 001/4 FIA 13,8 I 3. Edition

Testoil-ISO 4113

 $\overline{\mathbf{0}}$ 

PE 8 P 120 A 920/5LS 3804 ROV300-1050PA475

$$1 - 8 - 4 - 3 - 6 - 5 - 7 - 2$$
  
 $0 - 45 - 90 - 135 - 180 - 225 - 270 - 315 - 0,5 (0,75)^{\circ}$ 

supersedes81 companyiat 8285.22.002 243 kl! (330 PS)

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings
(3,45 - 3,65)
Port closing at prestroke
3,50 - 3,60 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes  3  20, 2 - 20, 6	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
	+ 0.1	2,8 - 3,6 c,Sp. 4-5	0,5(0,9) 0,8(1,2) 0,6(1,0)			۵

Adjust the fuel delivery from each outlet according to the values in (

#### **B.** Governor Settings

Upper rated s	Upper rated speed			Intermediate rated speed			speed	Cities also as to al		
deflection	rev/min Control rod travel	mm C	Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel	Slidings	deeve travel
lever 1	mm 2	rev/min (2)	lever	rev/min	mm (4)	lever	rev/min	mm 3	rev/min	
ca. 68	1050 1350	15,2-17,8 0 - 1				ca. 11		min. 7,5 5,9-6,1	70C	1,4-1,5 5,4-5,6
ca. 64	9,9 4,0	1090-1100 1185 <b>-</b> 1215					320-4	20 = 2,0	1050	8,0
						<b>③</b>				

Torque control travel a =

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test of ter		Rotational speed 20 imitation stermediste speed			Starting Idle switchin		Torque- travel	Control roc
rev/min	cm³/1000 strokes	revimm 40	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm²/1000 strökes	rev/min	travel mm
LDA 1050	0,7 bar 202,0-206,0 (199,0-209,0)		<u>Lna</u> 1050	9 bar 162,0-166,0 (159,0-169,0)		19,5=21 mmE Mannet 24 ! 28,0-36,0	R	

Checking values in brackets

\* 1 mm less control rod travel than col. 2

#3

# D. Adjustment Test for Manifold Pressure Compensator

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
3804 + 475 €	0,7 bar	0,36 0,30 0	10,9 - 11,0 10,6 - 10,7 9,7 - 9,9 9,3 - 9,4

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

WPP 001/4 FIA 13,8 L 2 1. Edition

<u>En</u>

PE 8 P 120 A 920/5 LS 3804

RQV 300-1050 PA 565

supersedes company: iat

1 - 8 - 4 - 3 - 6 - 5 - 7 - 2 je 45 ° + 0,5 ° (+ 0,75 °)

engine: 8285.22.002 243 kW (330 PS)

Komb.-Nr. 0 401 848 710

0

Testoil-ISO 411

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

3,5-3,6 Port closing at prestroke (3,45-3,65) mm (from

, are around an pro-		(3,43-3,03)				
Rotational speed ray/min	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1050	10,9+0,1	20,2-20,6	C,5(0,9)			
300	5,9-6,1	2,8-3,6	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated s	peed		Intermediate	rated sp	ed	Lower rated	speed		Sliding s	leeve travel
	rev/min Control	Control rod travel	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel		. ①
of control lever	rod travel	mm rev/min (28)	of control lever	rev/min	mm (4)	of control lever	rev/min	mm (3)	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
max.	1050	15,2-17,8	1	-	-	ca. 11	100 300	min. 7,5 5,9-6,1	250 520	0,4-0,7 4,1-4,8
ca. 64		1090-1100						•	780 1050	5,8 <b>-</b> 6,0 8,0
ļ	4,0 1350	1185-1215 0 - 1,0			•	320-420	}			•,•
				<u> </u>		<b>③</b>				

Torque control travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ten	i stop	Rotational-speed (20) fimitation intermediate speed	Fuel delivingh idle s	very characteristics (5a)	Starting Idle switchin	• , •	Torque- travel	control (5)
rev/min	crit <sup>3</sup> /1000 strokes .	rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	LEA/WIU	cm <sup>3</sup> /1000 strokes	rev/min	mm
1	2	3	4	5	8	7	8	9
LDA	0,7 bar	1090-1100 *	LDA	0 bar	-	•	-	-
1050	2020-206,0 (199,0-209,0		1050	162,0-166,0 (159,0-169,0				
						· · · · · · · · · · · · · · · · · · ·		

Checking values in brackets

\* 1 mm less control rod travel than col. 2

2.83

H11

BOSCH

Geschäftsbareich KM, Kundendienst, KTz-Ausrustung 6 by Robert Bosch GmbH, O-7 Stuttgart 1, Postfach 50, Printed in the Federal Republic of Germany Imprime an Republique Federale d Alternagne par Robert Bosch, Gmori

### D. Adjustment Test for Manifold Pressure Compensator

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

FIA 13,8 L 2

-2-

300			1 IN 13,0 L Z
Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (†) .
PE 8 PLS 3804 + RQVPA 565	0,36	0,70 0 0,30	10,6-10,7 10,9-11,0 9,3-9,4 9,7-9,9

Notes.

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

# Testoil-ISO 4113

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 VOL 7,0 k
2. Edition

Eα

PE 6 P 110 A 320 RS 423

RQV 250-1200 PA 435

Komb.-Nr. 0 401 846 448

superseday 82 company 01 vo fD 70 G engine: 157 kW (213 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

3.0 - 3.1

#### A. Fuel Injection Pump Settings

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
ev/min	mm 2	cm <sup>3</sup> /100 strokes	100 strokes	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6
700	10,8+0,1	10,2 - 10,4	0,4 (0,8)			$2,5 \pm 0,1$
250	4,5-4,7	0,9 - 1,3	0,3 (0,6)			(2,2 - 2,9)

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated s	peed			Intermediate	rated sp	eed			Lower	rated	speed			Sliding s	leeve travel	
	rev/min Control	Control rod (	9	Degree of deflection		Contravel		di	Degre deflec	tion		Control travel	rodi		1	
	uuu tog pavel	mm rev/min (2	. ` 1	of control lever	rev/min	MΠ		<b>(</b> •)	of con	trol	rev/min	mm	3	rev/min	mm	
1	2	3		4	5	6			7		8	9		10	11	Ц
max.	1200	15,2-17,	8	-	•		••		ca.	10	100	min.	6,0	200	1,1-1,4	1
ca. 65	9,8	1240-125									250	4,5-	1,7	530	3,5-3,	7
	4,0 1400	1320-135 0 - 1,	_ 1								380-4	40= 2	,0	870	5,2-5	,3
1	1400	0 - 1,	٦											1200	7,9	
ļ									<b>③</b>							

Torque control travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-roo Test oil ten		Rotational-s limitation intermediate			rery characteristics (5e) peed (5b)	Starting Idle switchin		Torque- travel	Control rod
rev/min	crh³/1000 strokes	rev/min	4	ten/witi	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	travel mm
1	2	3		4	5	6	7	8	9
LDA	0,7 bar	1240 -	1250*	LDA	0 bar	100	150,0-190,0	-	•
700	102,0-104,0 ( 99,0-107,0)			700	78,0 - 81,0 (75,0 - 84,0)		iei 20,0-21, mm RW	)	

Checking values in brackets

\*1 mm less control rod travel than col 2

3.83

VOL 7,0 k - 2 -

Test at n =

500

rev/min decreasing pressure - in har gauge pressure

300	I	[a4	diminution
Pump/governor	Setting	Measurement	Control rod travel-
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 6 PRS 423	0,7		10,8 - 10,9
+PA 435		0	9,5 - 9,6
		0,35	10,4 - 10,5
		0,26	9,8 - 10,0
	1		<u> </u>

Notes

(1) when n =

rev/min and gauge pressure = bar (= maximum full-load control rod travel)

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 UNI 9,6 a 4- Edition

PES6P110A720RS3105

0

**Testoil-ISO 4113** 

RQV275-1150PA642

supersed@.82 company.IVECO-UNIC 8220-22 engine: 176 kW (239 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Sertings

Port closing at pres	troke (3	15-3.35)	mm (from BDC)			
Rotational speed		Fuel delivery	Difference cm <sup>3</sup> /	Centrol rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	100 strokes	mm	cm <sup>2</sup> /100 strokes	നന
1	2	3	4	2	3	6
1150	11,7+0,1	12,2-12,4	0,4(0,8)			
275	5,3-5,5	0,9-1,5	0,4(0,7)			
					İ	
	1		<b>I</b>	Ī	1	

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated s	peed		Intermedia	te rated sp	eed	Lower rated	speed	1	Sliding s	leeve travel
		Control rod (travel	ノ deflection		Control rod travel	Degree of deflection		Control rod travel		. ①
	rod travel mm	mm rev/min (2	of control lever	rev/min	mm 4	of control	rev/min	mm 3	rev/min	ľ
1	2	3	4	5	6	7	8	9	10	11
max.	1190	15,2-17,8	-	-	-	ca. 11	100	min. 6,9	225	0,4-0,7
ca. 60		1190-1200					275	5,3-5,5		3,5-3,8 5,2-5,5
ļ	1400	1280-1310 0-1,0	'			280-375			150	8,0
						<b>②</b>				

Torque control travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc	1 stop	limitation	Fuel delivings ide s	ery characteristics (5a) peed (5b)	Starting Idle switchir		Torque- travel	Control (5)
rev/min	np. 40°C (104°F) (2) cm³/1000 strokes	rev/min 4e	rev/min	cm <sup>3</sup> /1000 strokes	rev/min		rev/min	travel mm
1	2	3	4	5	6	7	8	9
LDA 1150	0,7 bar 122,0-124,0 (119,0-127,	1190-1200 *	LDA 400	0 bar 87,0-89,0 (84,0-92,0)	100	160,0-180,0	•	•

Chucking values in brackets

\*1 mm less control rod travel than col. 2

2.83

H15

BOSCH

Geschäftsbereich KM. Kundendienst. Kiz-Ausrustung. C. by Robert Bosch Gmohl. D-7. Stuttgart 1, Postfach 50. Printed in the Federal Republic of Germany. Imprime en République Fédérale d'Allemagne par Robert Bosch GmbM.

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PES6PRS3105 + PA 642	0,23	0,70 0 0,21	11,3-11,4 11,7-11,8 10,5-10,6 10,8-11,0

Notes.

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

H16

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 STE 12,0 b 1 1. Edition

PE 8 P 110 A 121 LS 3113

RQV 250-1100 PA 652

supersedes

Komb.-Nr. 0 401 858 701

1 - 5 - 4 - 8 - 6 - 3 - 7 - 2 je  $45^{\circ} \pm 0.5^{\circ} (\pm 0.75^{\circ})$ 

companyteyr WD 815.64 engine: 240 kW

Testoil-ISO 4113

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at pres	stroke	(2,75-2,95)	mm (from BDC)			
Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm	cm³/100 strokes	cm³/ 100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
1107	12,0+0,1	15,8-16,0	0,4(0,75)			
250	1-6,3	1,5-2,1	0,4(0,7)			
	1					
				}		Ì

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated s	peed			Intermediate	rated sp	eed	Lower rated	speed		Sliding s	iceve travel
deflection	rev/min Control rod travel	Control rod travel	<b>(2)</b>	Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel		0
lever	mm .	rev/min	(29)		rev/min	mm (4)	lever	rev/min	mm (3)	rev/min	mm.
1	2	3		4	5	6	7	8	9	10	11
max.	1140	15,2-17	,8	-	-	-	ca. 12	100	min.7,7		0,7-0,9
ca. 47	11,0 4,0 1300	1140-115 1185-12 0-1,(	15					250 325-:	6,1-6,3 385 = 2,0		3,7-4,1 5,4-5,7 7,9
							<b>③</b>				

Torque control travel a = U<sub>s</sub> 4 mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load di Control-roi Test oil ten rev/min	1 stop np. 40°C (104°F) (2)	imitation intermediate speed	high idle s	rery characteristics 5e speed 50 cm <sup>3</sup> /1000 strokes	idie switchir		Torqua- trave/	Control rod travel
1	2	3	4	5	6	7	a	•
LDA 1100	0,9 bar 158,0-160,0 (155,0-163,0		LDA 500 LDA 500	0,9 bar 159,0-163,0 (157,0-165,0) 0 bar 111,0-113,0 (108,0-116,0)		240,0-280,0	310	12,0+0, 12,0+0, 12,2+0, 12,4+0,

Checking values in brackets

\* 1 mm less control rod travel than col. 2

3.83

STE 12,0 b 1

-2-

Test at n =

500

rev/mir coreasing pressure - in bar gauge pressur

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) ,
PE 8 PLS 3113	0,90		12,4 - 12,5
+ RQVPA 652		0	9,7 - 9,8
		0,60	11,8 - 12,0
		0,48	10,8 - 11,0

Notes

(1) when n =

rev/min and gauge pressure = bar (= maximum full-load control rod travel)

# Test Specifications Fuel Injection Pumps (1) and Governors

WPP 001/4 SCA 8,0 i

3. Edition

PE 6 P 110 A 720 RS 3034

ROV 20C-1200 PA 554

supersedes.81 companyScania

engine: DS 805

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Drifference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
12,3+0,1	12,1-12,3	0,6(0,8)			2,5+0,1
5,3-5,	1,5-1,9	0,2(0,4)			(2,2-2,9)
	mm 2 12,3+0,1	mm cm <sup>3</sup> /100 strokes 2 3 12,3+0,1 12,1-12,3	travel cm <sup>3</sup> /100 strokes cm <sup>3</sup> / 100 strokes 2 cm <sup>3</sup> / 100 strokes 4 12,3+0,1 12,1-12,3 0,6(0,8)	travel mm cm³/100 strokes 2 cm³/ 100 strokes 4 travel mm 2 12,3+0,1 12,1-12,3 0,6(0,8)	travel mm cm³/100 strokes 2 cm³/ 100 strokes 4 cm³/ 100 strokes 2 cm³/100 strokes 3 cm³/100 strokes 2

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Testoil-ISO 4113

Upper rated :	peed		Intermediate	mediate rated speed			speed		Sliding s	deeve travel
deflection	rev/min Control	Control rod travel	Degree of deflection		Control rod Degree of travel Control rod travel		1			
of control lever	rod travel	mm rev/min 2s 3	of control lever	rev/min	mm 4	of control lever	rev/min	mm 3	rev/min 10	mm 11
max.	1200	15,2-17,8	-	-	-	ca.10	100 225	min.6,8 5,3-5,5	150 500	0,5-0,8 3,8-4,5
ca. 61	11,3 4,0 1500	1240-1250 1380-1410 0-1,0	•					80=2,0	850 1200	5,9-6,1 8,4
						<b>③</b>				

Torque control travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Tost oil temp. 40°C (104°F) 2		Rotational-speed 20 limitation intermediate speed	Fuel delivingh idle s	ery characteristics (5a)	Starting Idle switching	<u> </u>	Torque- travel	control 5
f <del>ev/min</del> 1	cm³/1000 strokes	rev/min 4a	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min	cm <sup>3</sup> /1000 strokes 7	rev/min 8	travel mm 9
LDA 700	0,7 bar 121,0-123,0 (119,0-125,0)	1240-1250*	LDA 1200 LDA 500	0,7 bar 120,5-123,5 (118,0-126,0) 0 bar 87,0-91,0 (85,0-93,0)	100	190,0-240,0 =20,0-21,0 mm RW	•	•

Checking values in brackets

\*1 mm less control rod travel than col. 2

Test at n =

500

rev/min decreasing pressure – in bar gauge pressure

SCA 8,0 i

\_2\_

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 6 PRS 3034 +RQV PA 554	0,70	0 0,33 0,22	12,3-12,4 11,1-11,2 12,0-12,1 11,2-11,4

Notes:

(1) when n =

rev/min and gauge pressure = bar (= maximum full-load control rod travel)

# Test Specifications Fuel Injection Pumps (1) and Governors

WPP 001/4 SCA 11,0 r6 1. Edition

\_\_\_\_\_\_

PE 6 P 110 A 720 RS 3040

ROV 200-1000 PA 555-1

supersedes company: Scania DS 11

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke mm (from BDC) = RW 9.0-12.0 mm(3.25 - 3.45)Control rod travel Rotational speed **Fuel delivery** Control rod Fuel delivery Spring pre-tensioning (torque-control valve) Difference cm³/ rev/min cm<sup>3</sup>/100 strokes 100 strokes cm<sup>3</sup>/100 strokes mm 2,5 ±0,1 0.4 (0.8) 700 13,6+0,1 16,7-16,9 4,4-4,6 1,6-2,0 225 0,3(0,5) (2,2-2,9)

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Testoil-ISO 4113

Upper rated s	peed		Intermediate	rated sp	eed	Lower rated	spee'd		Sliding s	lesve travel
o'effection of control	rev/min Control rod travel	Control rod travel	of control		Control rod travel	Degree of deflection of control		Control rod travel		1
lever	mm 2	rev/min 2a	lever 4	rev/min 5	mm (4)	lever 7	rev/min 8	mm (3)	rev/min	mm 11
max.	1050	15,2-17,8	-	-	-	ca.10	100	min. 5,9	150 430	0,5-0, 3,1-3,
ca. 60		1040-1050 1140-1170 0 -1,0	.1			250-35		4,4-4,6	720 1000	5,1-5, 7,9
						<b>3</b>				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-ros Test oil ten		Rotational-speed 2b limitation antermediate speed			Starting fuel delivery   6   6   6   6   6   6   6   6   6		Torque- travel	control 5
revimin	cm³/1000 strokes	rev/min 4a	re/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	travel mm
LDA 700	0,7 bar 167,0-169,0 (164,0-172,0)	1040-1050*	LDA 1000 LDA 500	169,0-175,0 (167,0-177,0 0 bar	)	220,0-270,0 =RW 20,0- 21,0 mm	•	-

Checking values in brackets

\* 1 mm less control rod travel than col 2

1.83

Testatn =

500

rev/min decreasing pressure - in bar gauge pressure

SCA 11.0 r 6

-2-

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 6 P RS 3040	0,41	·	13,2-13,3
+ ROV PA 555-1		0,70	13,6-13,7
		0	12,0-12,1
		0,26	12,3-12,5
	·		

Notes

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

(3

#### 0 **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 MAN 17,4a

2. Edition

Testoil-ISO 4113

ROV 250-1150 PA 562 PE 10 P 110 A 520/4 LS 846

supersades

companyMAN

engine: D 2540 MT

323 kW (439 PS)

1 - 8 - 7 - 6 - 3 - 5 - 2 - 10 - 9 - 4  $0 - 27 - 72 - 99 - 144 - 171 - 216 - 243 - 288 - 315 <math>\stackrel{+}{=} 0,5^{\circ} (\stackrel{+}{=} 0,75^{\circ})$ 

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

3,0 - 3,1 (2,95-3,15) mm (from BDC) Zyl. 10

Rotational speed rev/min 1	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1150	11,9+0,1	14,0 - 14,2	0,4(0,8)			
250	6,9-7,1	1,1- 1,7	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated s	peed		Intermediate	rated sp	eed	Lower rated	speed		Sliding s	leeve travel
deflection	rev/min Control	Control rod travel	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel		0
of control	rod travel	rev/min (28)	of control lever	rev/min	mm (4)	of control	rev/min	mm (3)	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
zax.	1150	15,2-17,8	-	-	-	ca.12	100 250	min.8,6 6,9-7,1	200 500	0,6-0,8 4,3-5,3
ca.64	10,9 5,0 1450	1190-1200 1335-1365 0 - 1,0						60 = 2,0	850 1150	6,6-6,7 8,4
						<b>③</b>				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-roi Test oil ten		Rotational-speed (2b) limitation intermediate speed	Fuel delivery characteristics 5e Starting fuel delivery idle speed (3)  Starting fuel delivery idle switching point		Idle		Torque- travel	control (5)
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	crh³/1000 strokes	rev/mun 49	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min 8	travel mm
LDA 1150	0,9 bar 140,0-142,0 (137,0-145,0)		LDA 750 LDA 500	0,9 bar 134,0-138,0 (131,0-141,0) 0 bar 115,0-118,0 (112,0-121,0)		145, 0- 175, 0	1	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

2.83

restarn = 500	increasing XXXXXX	om Annae hissanin	MAN 17,4 a -2
Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
LS 846 +	0,9		11,9 - 12,0
PA 562		0,38	11,7 - 11,8
		0,33	11,3 - 11,5
		0	11,1 - 11,2
		<u> </u>	L

Notes

(1) when n =

rev/min and gauge pressure =

bar ( = maximum full-load control rod travel)

estoil-ISO 4113

Test Specifications
Fuel Injection Pumps 2
and Governors

40

WPP 00 1/4 MB 21,9a

3. Edition

3.

PE 12 P 120 A 320 LS 3819

RQ 750 PA 635

supersedes6.82 company: Daimler-Benz

1- 5- 9- 8- 3- 4- 11- 10- 2- 6- 7- 12 0-15-60-75-120-135-180-195-240-255-300-315° -0.5° (-0.75°) OM 424 A 330 kW (449 PS)

Generator

Komb.-Nr. 0 401 840 705

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at prestroke

(3.95-4.15)

mm (from BOQ1y1, 12

Rotational speed	Control rod travel	ivel		Control rod	Fuel delivery  cm <sup>3</sup> /100 strokes	Spring pre-tensioning (torque-control valve)
rev/min 1	mm 2	3	100 strokes 4	mm 2	3	6
700	11,9+0.	1 19.3 - 19.5	0,5(0,8)			
300	4,8-5,	0 1,4 - 2,0	0,8(0,7)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

PRG che	Control rod	Full-load Setting p	oint Central	Test spec	cifications (4)	idle spec Setting p	Control		crifications 5	Torque d	Control rod
rev/min 1	travel mm 2	rev/min 3	red travel rnm 4	red travel rn/m 5	rev/min 6	rev/men 7	red treed rnm 8	r <del>av</del> /min 9	travel mm 10	rëv/min 11	travel mm 12
•	•	-	-	10,9 4,0	750-755 780-790	-	-	-	•	-	-
						:					

Torque-control travel on flyweight assembly dimension a =

mm

Speed regulation: At

750-755 min

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	alivery on ontrol lever up. 40°C (104°F)	2)	Control rod stop 3a	Fuel deliv	ery characteristics	LV	Starting fi tide spec	d (and the control of
revimin 1	cm <sup>3</sup> /-1000 strokes 2		rev <i>k</i> min 3	rev <i>lensi</i> s 4	cm³/-1000 strokes. \$		rgodmun G	ud tradi cm <sup>2</sup> /1000 strokes f mm 7
700	193,0 - 195,0 (190,0 - 198,0)	)		•			100	180,0 - 200,0

Checking values in brackets

Values apply to

engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1 680 750 067

OSCH CHECK PROOF

schaftsbereich RH. Kundendienet Mitz Auerustung. 980 by Robert Besch: GimeM. Poelfisch 50. D-7000 Shuttgart 1. Philited in the Federal Republik of Germany. Intime en Res; Jimsus Firsh: sik 3 Artem wine par Robert Bonch. Ginert PE 12 P 120 A 320 LS 3819

RO 900 PA 634

supersedes-

company: Daimler-Benz OM 424 A

1 - 5 - 9 - 8 - 3 - 4 - 11 - 10 - 2 - 6 - 7 - 12 0 -15 -60 -75 -120-135-180-195-240-255-300-315°  $\pm$  0,5°( $\pm$  0,75°)° Values apply to

374 kW

engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1
All test specifications are valid for Boach Fuel Injection Pump Te 1 680 750 067

Komb.-Nr. 0 401 840 704

A. Fuel Injection Pump Settings

4.0 - 4.1

mm (from BDC)	Zyl.	12
Difference	Contra	

Rotational speed rev/min 1	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control velve) mm 6
850	12,0+0,1	17,9-18,1	0,5 (0,9)			
300	4,8-5,0	1,2-2,0	0,8 (1,2)			

ery from each outlet according to the values in ...

#### **B. Governor Settings**

Checking of six PRG check	<b>1</b>	Full-toad s Setting po			ofications (4)	idle spec Setting p				Torque d	3)
rev/min min 2		revinus 3		Country and Street France 5	ravimus 6		Control red transi From 8	9	Control rad travel mm	rgudania 11	Combot red travel mm
-	-	-	-	10,8 4,0 1050	900-905 935-945 max. 1,0	• .	-	•	• .	-	-

rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F)		Control rod stop	Fuel deliv	ary characteristics 39	Starting I like spec	Starting fixed delivery title speed (anti-		
renteus 1	cm <sup>3</sup> /-1000 strokes 2	revinia 3	rovimin 4	cm <sup>3</sup> /-1000 strokes 5	rayimus 6	can <sup>3</sup> /1000 strokes / min 7		
850	179,0-181,0 (176,0-184,0)	-	-	•	100	180,0-200,0		

Checking values in brackets

3.83

12

Testoil-ISO 4113

# **Test Specifications** Fuel Injection Pumps 2 and Governors

WPP 001/4 MAN 17,4 b 3

1. Edition

PE 10 P 120 A 520/5 LS 850

RO 750 PA 404-2

COMPANY MAN

1-8-7-6-3-5-2-10-9-4 0-27-72-99-144-171-216-243-288-315° -0,50 (-0,75°)

engine. D 2540 MLE

Values apply to engine nozzle-and-holder assemblies 1 688 901 019

1 680 750 067

283 kW

and engine fuel-injection tubing et specifications are valid for Beach Fuel Injection Pump Test Benches and Testers

Komb.-Nr.

A. Fuel Injection Pump Settings

Port closing at prestroke

(2.95 - 3.15)

men (from BDC) Zy1. 10

0 401 849 164

Rotational speed rav/min	Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes 3	Oxference cm <sup>3</sup> / 100 strokes 4	Control rod traval	Fuel delicary cm <sup>3</sup> /100 strakes 3	Spring one-tensioning florquiz-control valve; mm
700	11,8+0,1	19,1-19,4	0,5(0,9)			
250	6,6-6,9	2,2-2,6	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checkin PNG che		$\overline{}$	Full-foad speed regulation Setting point   Test specifications (4)			Setting point   Test specifications (5)				Torque '	3	
	Control rod Travel rose 2		revinus 3		Committee out transit from 5	revines 6	rouiman 7		rendena	Control rod travel mm	revinus 11	Control rod travel men 12
-	-		•	•	10,8 4,0 900	750-755 780-790 0-1,0	•	-	-	-	•	-

750-755 min-1

#### C. Settings for Fuel Injection Pump with Fitted Governor

governor o	telivery on control lever mp. 40°C (104°F)	Combrol rod stop	Feet date	ory characteristics 36	Starting I	Starting had delivery (6) (aller speed (aller set ized)		
rawhnus 1	cm <sup>3</sup> /-1000 strokes 2	3	repulsus 4	cm <sup>2</sup> /-1000 strokes 5	ravimus B	cm <sup>3</sup> /1000 strokes-/ mm 7		
700	191,0-194,0 (188,0-197,0)	-	-	•	100	19,5-21,0 mm RW		

Checking values in brackets

2.83

13

# **Test Specifications** Fuel Injection Pumps (2) and Governors

WPP 001/4 MAN 11,4 c

1. Edition

Control rod

PES 6 P 120 A 720 LS 457

RQ 750 PA 566

cm³/ 100 <del>strokes</del>

0.5(0.8)

0.8(1.2)

Values apply to engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing

MAN D 2566 MLE 198 kW

Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

**Fuel delivery** 

cm<sup>3</sup>/100 strokes

20,2-20,4

1,5-2,1

A. Fuel Injection Pump Settings

Control rod

12.5+0.1

6,1-6,3

Port closing at prestroke

Rotational apead

700

250

mm (from BDC) Zy1. 6 = (2,95-3,15)

RW 9,0-12,0 mm

Fuel delivery	Spring pre-tensioning (forque-control valve)
cm <sup>3</sup> /100 strokes	mm
3	6
	1
}	

ary from each outfet according to the values in

**B. Governor Settings** 

	g of slider		Full-toad				lde spe				Torque	
PRG che	ch Control rod	$\mathbf{O}$	Se ting po		-	ofications (4)	Setting (	Control	Test spu	Control rod		Control rod
rentam 1	7376 Am		**************************************	1	and transl	rere/mun	r <del>gv/min</del>	men 8		travel mm 10	r <del>ov/mu</del> n	mm 12
•	-		-	-	11,5 4,0 900	750-755 775-785 0-1,0	-	•	-	-	•	
						•				•		
				-					750-7	55 min		

C. Settings for Fuel Injection Pump with Fitted Governor

	control lever up. 40°C (104°F)	Control rod stop	Fuel delay	ory characteristics 36	Starting I	had delivery 6
revitaus 1	cm <sup>3</sup> /-1000 strokes 2	r <del>ovima</del> 3	revinus 4	cm³/-1000 strokes 5	revimo	cm <sup>3</sup> /1000 strokes-/ mm 7
700	202,0-204,0 (199,0-207,0)	•	-	•	100	19,5-21,0 mm RW

Checking values in brackets

rod travel

J4

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 BET 8,8 a

2. Edition

PE 6 P 120 A 320 RS 383 ROY 250-1200 PA 425 R

Values apply to engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1 680 750 067

company: RVI MIDS 062030 engine: 165,5 kW (225 PS)

Komb.-Nr. 0 401 846 404

All test specifications are velid for Boach Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at pres	stroke (	2.75-2.95)	mm (from BOC)_	RN 9.0	- 12.0 mm	
Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev <i>ir</i> nin 1	meth 2	cm <sup>3</sup> /100 strokes 3	100 strokes	msn 2	cm <sup>2</sup> /100 strokes 3	mm 6
1200	13,9+0,1	14,8 - 15,1	0,5(0,9)			
275	4,7-4,9	0,8 - 1,4	0,8(1,2)			1
	<u> </u>				•	

Adjust the fivel delivery from each oudet according to the values in

#### **B.** Governor Settings

Testoil-ISO 4113

Upper rated s	peed			Marmachati	rated ap	eed .		Lower rated	speed		String	loave travel
	rev/min Control	Combol rod ( travel	$\odot$	Degree of deflection	<b>l</b> .	Combi	per te	Degree of deflection		Control radi		. 0
of control lever	rod travel rom 2	700 100 3	3	of control lever 4	rev/min S		•	of control lever 7	romanin B	<b>—</b> ③	10	num i i
max.	1240	15,2-17	,8		-		-	ca. 12	100 275	min.6,3 4,7-4,9	200 530	0,2-0,6 2,9-3,1
ca. 66	12,9 4,0 1500	1340-13	70						2/3	14,1-4,3	870 1200	4,8-5,0 8,0
2	1300	0 - 1	,0					<b>③</b>				

Torque control travel e =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-roi Test oil ten		Rotational speed (20) simulation intermediate speed	Fuel delin	any characteristics (S)	Starting Idle switchin	. •	Torque- travel	Control roc
new/rests	cm³/1000 strokeo	rgu/tmin 😐	rev/min	cm³/1000 strokes	rev/min	cm-V1000 strokes	revinen	travel men
1	2	3	4	5	•	7	8	9
LUA 1200	0,7 bar 148,0-151,0 (145,0-154,0		LDA 700	0,7 bar 144,0-1&8,( (141,0-151,(		120,0-140,0 = RW 19,5 - 21,0 mm	•	-

Checking values in brackets

\* 1 mm less control rod travel than col 2

2.83

15

BET 8,8 a - 2 -

Test at n =

500

rev/min decreasing pressure - in ber gauge pressur

Pump/governor	Setting	Messurement	diminution Control rod travel- difference
	Gauge pressure = ber	Gauge pressure = bar	mm (1)
PE 6 PRS 383 + RQVPA 425 R	0,23	0,70 0 0,19	13,4 - 13,5 13,9 - 14,0 12,2 - 12,3 12,6 - 12,8

**Notes** 

(1) when n =

rev/min and gauge pressure :

ber ( = maumum kull-load control rod travel)

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 RVI 8,8 d 1 1. Edition

PES 6 P 120 A 320 RS 419

RQV 275-1100 PA 495

company: RVI

Values apply to

0

Testoil-ISO 4113

engine nozzle-and-holder assemblies 1 688 901 019

MIDR 062045 206 kW (280 PS)

and engine fuel-injection tubing

1 680 750 067

Komb.-Nr.

All that specifications are valid for Boach Fuel Injection Pump Test Banches and Testers

0 402 046 249

A. Fuel Injection Pump Sattings
2,8 - 2,9
Port closing at prestroke (2,75-2,25) mm

Rotational speed rev/min 1		Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>2</sup> / 100 strokes 4	Control rod travel mun	Fuel delivery cm <sup>2</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	10,3+0,	17,7 - 18,1	0,4(0,8)			
275	3,4-3,6	0,5 - 1,1	0,4(0,7)			
	L					

ry from each outlet according to the values in

#### **B.** Governor Settings

Upper rated a	peed		Intermediate	rated sp	eed	Lower rated	speed		Sides.	Jeone travel
		Control rod Towns	Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel		0
Nover 1		rev/min ②	lover	rov/min S	<b>-</b> •	lever	rev/man	mm 3		mm
max.	1150	15,2-17,8	-	-	-	ca. 8	100	min.5,0		1,0-1,2
ca.64	9,3 4,0	1155-1165 1220-1250				280-395	275	3,4-3,6		4,0-4,6 5,9-6,1 8,1
	1350	0 - 1,0								
						<b>③</b>				

Torque control travel a \*

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load di Control-roi Test oil ten		Rotational speed (20) timutation stermediate speed	Fuel delin high idle s	ery characteristics (3e paid (3e)	kile	fuel delivery 6	Torque- travel	Control roo
rev/min	cm³/1000 strokes	rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	travel mm
1	2	3	4	5	0	7	8	9
1100	0,7 bar 177,0-181,0 (174,0-184,0		LDA 700	0,7 bar 163,0-196,( (160,0-172,(		130,0-150,0	•	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

2.83

- 2 -

Testatin =

500

rev/min decreasing pressure - in bar gauge pressure increasing

RVI 8,8 d 1

Pump/governor	Setting	Measurement	diminution Control rod travel-
	Gauge pressure = ber	Gauge pressure = ber	difference mm (1)
PES 6 PRS 419 + RQVPA 495	0,25	0,70 0 0,20	9,7 - 9,8 10,3 - 10,4 8,3 - 8,5 8,8 - 9,0

Notes

(1) when n =

rev/min and gauge pressure = bar (= maximum full-load control rod travel)

# Test Specifications Fuel Injection Pumps 1 WPP 001/4 MB 14,6 o and Governors 2. Edition

PE 8 P 120 A 320 LS 3816 RQV 350-1150 PA 590 1 - 8 - 7 - 2 - 6 - 3 - 54 je 45° + 0,5° (+ 0,75°) Values apply to engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1 680 750 067

companyDaimler Benz engine: OM 422 A 243 kW (330 PS)

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

#### A. Fuel injection Pump Settings

0

Testoil-ISO 4113

Port closing at pres	troke	(3.95-4.15)	mm (from BDC)			
Rotational apeed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min 1	mm 2	cm <sup>3</sup> /100 strokes 3	cm <sup>3</sup> / 100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6
1150	1,0+0,1	15,8-16,0	0,5(0,9)			
350	4,9-5,1	1,2-1,8	0,8(1,2)			
	ĺ					
1	1		1	1	l .	1

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated s	peed		Intermediat	e rated sp	eed	Lower rated	speed		Stiding s	sieeve travel
deflection	rev/min Control	Control rod travel	) cauacuon		Control rod travel	Degree of deflection		Control rod travel		. 0
of control lever	nod travel	nev/min (2	of control	rev/min	mm ④	of control lever	rev/min	mm ③	rev/min	mm .
1	2	3	4	5	6	7	8	9	10	11
max.	1150	15,2-17,8	-	-	-	ca. 10	100	min.6,0	300	0,6-0,9
ca. 63	10.0	1190-1200	7				350	4,5-4,6	580	3,6-3,8
		1270-1300							870	5,2-5,4
	1400	0 - 1,0				370-480			1150	7,6
			İ			<b>③</b>				

Torque control travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-toed de Control-roc Test oil terr	qots t	Rotational-speed 20 limitation intermediate speed	Fuel delin high idle s	rery characteristics (5e)	Sterting Idle switching		Torque- travel	Control Co
rev/min 1	ch <sup>3</sup> /1000 strokes .	rev/min 4a	rev/min	cm <sup>3</sup> /1000 strokes 5	rev/min	cm <sup>3</sup> /1000 strokes 7	rw/min 8	travel mm
LDA 1150	0,7 bar 158,0-160,0 (155,0-163,0)		LDA 600 LDA 500	0,7 bar 166,0-172,0 (163,0-175,0) 0 bar 140,0-142,0 (137,0-145,0)		140,0-160,0	850	i1,0+0, 11,4+0, 11,5+0,

Checking values in brackets

\* 1 mm less control rod travel than col 2

Jg

Test at n =

500

rev/min decreasing pressure ~ in bar gauge pressure

MB 14,6 o

-2-

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 8 PLS 3816 +PA 590	0,47	0,70 0 0,40	11,4-11,5 11,6-11,7 10,5-10,6 10,9-11,0

Notes.

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 VOL 12.0 d 1 3. Edition

PE 6 P 120 A 320 RS 3050

ROV 250-1100 PA 611

supersedes 82 companylolvo engine: TD 120 F

Values apply to

Testoil-ISO 4113

engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1 680 750 067

All test specifications are valid for Boach Fuel Injection Pump Test Sendade and Tasters

**A. Fuel Injection Pump Settings** 2,4-2,5

mm (from BDC) = RW 9,0 - 12,0 mm Port closing at prestroke (2.35-2.55)

Rotational speed rev/min t	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Cearrol rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	13,1+0,	1 24,2-24,5	0,5(0,9)			2,5 ±0,1
250	3,8-4,0	2,2-2,6	0,5(0,7)			(2,2-2,9)

Adjust the fuel delivery from each outlet according to the values in F

#### **B. Governor Settings**

Upper rated s	peed			Intermed	liate	rated sp	boo		Lower rated	speed			Sidina s	leave travel
deflection		Control rod	<b>(9)</b>	Degree o	n		Contr		Degree of deflection		Control travel	rod		0
of control lever	rod travel	rev/min	<b>(29)</b>	of contro		rev/min	mm	<b>(4)</b>	of control	rev/min	mm	(3)	rev/min	mm .
1	2	3		4		5	6		7	8	9		10	11
max.	1180	15,2-17	<u>,8</u>	•	•	•		-	ca. 7	100	min.	5,3	200	0,7-0,9
ca. 65	12,1 4,0	1160-11 1225-12									3,8-4  350=2,		CCO	4,2-4,8
	1350	0 - 1,	_						1	230-	)JU-2 ,	,0	1040	5,4-6,6
										1			1100	7,3
									<b>③</b>					

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ten	d stop	Rotational-speed (20) limitation intermediate speed	Fuel delivingh de s	ery characteristics (5e peed (3b)	Starting idle switchir	• . •	Torque-	Control rod
rev/min	c/h³/1000 strokes .	rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	travel mm
1	2	3	4	5	6	7	8	9
LDA 700	1,2 bar 241,5-244,5 (238,5-247,5)		LDA 700	0 bar 142,5-146,5 (139,5-149,5	100	20.0-21,0 mm RW	1	•

Checking values in brackets

\* 1 mm less control rod travel than col. 2 1.83

Test at n =

500 rev/min decreasing pressure ~ in bar gauge pressure

VOL 12,0 d 1 -2-

	<del> </del>		100 12,0 0
Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure ≃ bar	Gauge pressure = bar	mm (1)
PE 6 PRS 3050 + RQV PA 611	0,67	1,2 0 0,30	12,2-12,3 13,1-13,2 9,2-9,3 10,5-10,7

Notes:

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 MAN 17,4 b 1

1. Edition

ROV 250-1150 PA 647 PE 10 P 120 A 520/4 LS 850

supersedes companyMAN engine: D 2540 MLE 405 kW

1-8-7-6-3-5-2-10-9-0-27-72-99 -144-171-216-243-288-315° -0,5° (-0,75°) Values apply to

engine nozzle-and-holder assemblies 1 688 901 019

All test specifications are valid for Bosch Fuel Injection Pump lest Benches and Tasters — injection tubing 1 680 750 067

A. Fuel injection Pump Settings 3,0-3,1

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1150	11,2+0,1	18,5-18,8	0,4(0,9)			
250	6,2-6,4	1,2-1,8	0,8(1,2)			
ن						

Adjust the fuel delivery from each outlet according to the values in [

#### **B.** Governor Settings

Upper rated s		).	Intermediate	rated sp	1	Lower rated	speed	1.	Sliding s	leeve travel
deflection	rev/min Control rod travel mm	travel	Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel	rev/min	①
1	2	3	4		6	7	8	9	10	11
max.	1200	15,2-17,8	-	-	-	ca. 12		min.7,8 6,2-6,4		0,6-0,8 4,9-5,2
	10,2 4,0 1400	1190-1200 1255-1285 0-1,0					1	170=2,0		6,1-6,4 7,5
						<b>③</b>				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load di Control-roi Test oil ten	d stop	Rotational-speed 20 limitation intermediate speed			Starting Idle switchin	. •	Torque- travel	control 5
rev/min	cm³/1000 strokes	rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	_
LDA 1150	1,0 bar 185,0-188,0 (182,0-191,0)	1190-1200*	LDA 500	0 bar 119,0-122,0 (116,0-125,0		205,0-225,0	-	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

J13

Testoil-ISO 4113

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

MAN 17,4 b 1

-2-

300			
Pump/governor	Setting	Measurement  Gauge pressure = bar	diminution Control rod travel- difference mm (1)
	Gauge pressure = bar	Gauge pressure = bar	
PE 10 PLS 850 +RQV PA 647	1,0	0 0,65 0,54	11,2-11,3 9,6-9,7 10,8-10,9 10,0-10,3
	1		

Notes.

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

# **Test Specifications** Fuel Injection Pumps 1

and Governors

WPP 001/4 BRE 30,8 a

#### 1. Edition

PE 8 P 130 A 520/6 LS 450

ROV 300-900 PA 500

1-2-6-3-4-5-7-8 je  $45^{\circ} -0,5^{\circ} (-0,75^{\circ})$ 

Values apply to

engine nozzle-and-holder assemblies 1 688 901 019 1 680 750 067 and engine fuel-injection tubing

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

supersedes

companyBreda

engine: ID 36 N 8 V

# A. Fuel Injection Pump Settings 3,5-3,6 Port closing at prestroke (3,45-3,65) mm

Komb.-Nr. 0 401 838 020

Testoil-ISO 4113

mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /190 strokes 3	Spring pre-tensioning (torque-control valve) mm
900	9,2-9,3	16,5-16,8	0,5(0,9)			
300	6,8-7,0	2,2-2,8	0,8(1,2)		3	

Adjust the fuel delivery from each outlet according to the values in [

#### **B.** Governor Settings

Upper rated s	peed		Intermediate	rated sp	<del>oo</del> d	Lower rated	speed		Slidings	leeve travel
deflection	ection Control travel		Degree of deflection of control	deflection		Degree of deflection	Control rod travel		0	
	rod travel	rev/min (22	lever	rev/min	mm (4)	of control	rev/min	тт (3)	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
max.	990	15,2-17,8	-	-	-	ca.16			250	1,0-1,3
ca. 57	8,2 4,0	940-950 1000-1030					300		470 680 900	3,8-4,4 5,6-5,8 7,6
	1150	0-1,0				300-395	l			
						<b>3</b>				

Torque control travel a

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of Control-ro Test oil ter		Rotational-speed (2b) limitation intermediate speed	Fuel delin high idle s	rery characteristics (5e to compare the compare to compare the compare to compare the compare to compare the compare to compare the compare to compare the compare to compare the compare to compare the compare to compare the compare th	Starting kille switchin		Torque- travel	control (5)
rev/min		rev/min 40	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	travel
900	165,0-168,0 (162,0-171,0)		•	-	100	19,5-21,0 mm RW	•	•

Checking values in brackets

\* 1 mm less control rod travel than col. 2

# Test Specifications Fuel Injection Pumps (1) and Governors

WPP 001/4 BRE 9,6 c 1. Edition

معر

PE 6 P 120 A 320 RS 461

RQV 300-1500 PA 500

supersedes Breda company: ID 32 engine: 243 kW

Values apply to

0

Testoil-ISO 4113

engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1 680 750 067

Komb.-Nr. 0 401 846 478

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel dalivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
10,0+0,	14,5-14,9	0,5(0,9)			
7,1-7,3	1,5-2,1	0,8(1,2)			
	mm 2 10,0+0,	mm cm <sup>3</sup> /100 strokes 2 3 10,0+0,1 14,5-14,9	mm cm³/100 strokes cm³/ 2 cm³/100 strokes cm³/ 100 strokes 4 10,0+0, 14,5-14,9 0,5(0,9)	mm cm³/100 strokes cm³/ 100 strokes cm³/ 100 strokes dmm 2 2 10,0+0, 14,5-14,9 0,5(0,9)	mm cm³/100 strokes 2 cm³/ 100 strokes 2 cm³/ 100 strokes 2 cm³/ 100 strokes 2 cm³/100 strokes 2 cm³/100 strokes 2 cm³/ 100 strokes 2 cm²/ 100 stro

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated s	peed		Intermediate	rated sp	eed	Lower rated	speed	•	Sliding sleeve travel	
deflection		Control rod travel	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel		
jevet or country	rod travel mm	rev/min 2a	of control lever	rev/min	mm (4)	of control lever	rev/min	mm 3	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
max.	1500	15,2-17,8	-	-	-	ca.14	100 300	min.8,7 7,1-7,3	250 670	1,0-1,2 3,8-4,0
ca. 62	9,0	1540-1550 1625-1655					300	, , , 1 - , , 3		5,9-6,1
	1750					335-450			1300	0,0
						<b>39</b>				

Torque control travel a =

me

#### C. Settings for Fuel Injection Pump with Fitted Gevernor

Full-load de Control-roo Test od ten		intermediate speed	high idle s	ery characteristics (5a) peed (3b)	Starting Idle switching	. •	Torque- travel	control 5
rev/min	cm³/1000 strokes	rev/min	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/mun	travel mm
1	2	3	4	5	6	7	8	9
1500	145,0-149,0 (142,0-152,0		ŧ	•	100	19,5-21,0 mm RW	•	1

Checking values in brackets

\*1 mm less control rod travel than col. 2 2.83

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 BEE 9,7 a

1. Edition

PE 6 P 120 A 320 RS 460

RQV 300-1500 PA 500

1- 2- 3 - 4 - 5 - 6 0-45-120-165-240-285 ° + 0,5 ° (+ 0,75 °)

Breda SE GI 367,5 kW

> Komb.-Nr. 0 401 846 477

ill test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings 3,5-3,6

Port closing at pres	troke	3,45-3,65)	mm (from BDC)			
Rotational speed	Control rod	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/inm	mm .	cm <sup>3</sup> /100 strokes	100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	0
1500	10,0+0,1	14,6-14,9	0,5(0,9)			
300	7,8-8,0	1,4-2,0	0,8(1,2)			
	!					

Adjust the fuel delivery from each outlet according to the values in [

#### **B.** Governor Settings

Testoil-ISO 4113

Upper rated	speed		Intermediate	rated sp	eed	Lower rated	speed	Sliding sleeve travel		
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min 22	Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	:ey/min	Control rod travel mm 3		mm (1)
1	2	3	4	5	6	7	В	9	10	11
max.	1500	15,2-17,8	-	-	-	ca.18	100	min.9,4 7,8-8,0	250 670	1,6-1,8
ca.63	9,0	1540-1550					300			6,2-6,4
	4,0 1750	1625-1655 0 - 1,0				335-440			1300	3,1
						<b>(30)</b>				

Torque control travei a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of Control-ro Test oil ter	d stop	Rotational-speed 20 firmitation intermediate speed	Fuel deliv		Starting Idle switching	. •	Torque- travel	Control cod
rev/min	cm³/1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	travel mm
1	2	3	4	5	6	7	8	9
1500	146,0-149,0 (143,0-152,0		-	-	100	19,5-21,0 mm RW	-	-

\* 1 mm less control rod travel than col. 2

Checking values in brackets Values apply to

engine nozzle-and-holder assemblies 1 688 901 019 1 680 750 067 and engine fuel-injection tubing

2.83

### **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 BRE 23,1 a 1. Edition

PE 6 P 130 A 320/3 LS 449

ROV 300-900 PA 500

1 - 6 - 5 - 4 - 3 - 2 0 -75 -120-195-240-315° ± 0,5° (± 0,75°) Values apply to companBreda ID 36 N 6 V 225 kW

engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1 680 750 067

Komb.-Nr. 0 401 836 022

A. Fuel Injection Pump Settings 3,5 - 3,6 Port closing at prestroke (3,45-3,65) mm

mm (from 8DC)

		10110				
Rotational speed rev/min	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
900	9,2-9,3	16,5-16,8	0,5 (0,9)			
300	6,8-7,0	2,2-2,8	0,8 (1,2)			

Adjust the fuel delivery from each outlet according to the values in [

#### **B. Governor Settings**

Testoil-ISO 4113

Upper rated s	peed			Intermediate	eed	Lower rated	speed	Sliding sleeve travel			
deflection of control	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	(b) (2s)	Degree of deflection of control lever	rev/min 5	Control rod travel mm 4	Degree of deflection of control lever	rev/min	Control rod travel mm 3	rev/min	1) mm
max. ca. 57	990 8,2 4,0 1150	15,2-17 940-950 1000-103 0-1,0	) 30	•	1	-	ca. 16 300-395		min. 8,4 6,8 - 7,0	250	1,0-1,3 3,8-4,4 5,6-5,8 7,6

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ten	elivery d stop np. 40°C (104°F) 2	Rotational-speed 20 imitation intermediate speed	Fuel delic high idle s		Starting idle awitching	. •	Torque- travel	control 5
rev/min 1	cm³/1000 strokes .	revimin 4a 3	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	travel mm
900	165,0-168,0 (162,0-171,0		9	- -	100	19,5-21,0	•	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

2.83

# **Test Specifications** Fuel Injection Pumps 1 WPP 001/4 MAN 17,4 b 2 and Governors

1. Edition

PE 10 P 120 A 520/4 LS 850

RQV 250-1150 PA 645

supersedes companMAN

1-8-7-6-3-5-2-10-9-4 0-27-72-99-144-171-216-243-288-315° -0,5° (+ 0,75°) Values apply to

engine. D 2540 MLE 405 kW (551 PS)

engine nozzle-and-holder assemblies 1 688 901 019 and engine fuel-injection tubing 1 680 750 067 p Test Benches and Testars 0 401 849 165

A. Fuel Injection Pump Settings

Testoil-ISO 4113

3,0-3,1

Rotational speed rev/min	Control rod travel	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 8
1150	11,2+0,1	18,6-18,9	0,5(0,8)			
250	6,1-6,3	1,4-2,0	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in [

#### **B.** Governor Settings

Upper rated s	pper rated speed				rated sp	<del>oo</del> d		Lower rated speed				Sliding e	loeve travel
deflection	rev/min Control	Control rod travel	<b>①</b>	Degree of deflection of control		Contro travel	bon K	Degree of deflection		Contro travel	ol rod	Sidings	1
lever 1	rod travel mm 2	rev/min	<b>②</b>	lever	rev/min 5	mm 6	•	of control lever 7	rev/min 8	mm 9	3	r <del>e</del> v/m <del>i</del> n 10	mm 11
max.	1200	15,2-17,	8	•	•			ca. 11		min.			0,6-0,8
Ca. 63		1190-120 1255-128 0 - 1,0	35						250 380-4		-6,3 2,0		4,8-4,9 5,9-6,2 7,9
								<b>③</b>					

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load di Control-roi Test oil ten		Rotational-speed 20 limitation intermediate speed	Fuel delichigh idle s	rery characteristics (Se poed (Sb)	Starting idle switching	. •	Torque- travel	Control rod
rev/min 1	cm <sup>3</sup> /1000 strokes . 2	rev/min 4a 3	rev/min 4	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>2</sup> /1000 strokes	rev/min 8	travel mm
1150	186,0-189,0 (183,0-192,0		•	•	100	270,0-290,0		•

Checking values in brackets

\* 1 mm less control rod travel than col. 2

2.83

# Test Specifications Fuel Injection Pumps (1) and Governors

WPP 001/4 MB 12,8 n 2 1. Edition

E٥

PE 8 P 100 A 320 LS 819

①

Testoil-ISO 4113

RQV 350-1250 PA 378 R

sup~raede

companDaimler-Benz engine: OM 402

188 kW (256 PS)

Komb.-Nr. 0 401 848 073

1 - 8 - 7 - 2 - 6 - 3 - 5 - 4 je 45 °  $^{+}$  0,5 ° ( $^{+}$  0,75°)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke (3.35–3.55) mm (from BDC)

Rotational speed | Control rod travel | Fuel delivery | Difference | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod travel | Control rod t

rev/min 1	mm 2	cm <sup>3</sup> /100 strokes 3	100 strokes 4	mm 2	cm <sup>2</sup> /100 strokes 3	mm 6
1230	10,3+0,1	10,0-10,2	0,3(0,6)			
350	7,5-7,7	2,0- 2,4	0,3(0,5)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Sattings

Upper rated :	speed		In	ntermediate	rated spe	ed		Lower rated	speed			Sliding s	leave travel
Degree of deflection of control	rev/min Control	Control rod travel	ツー	to senge		Control rod travel	l	Degree of deflection of control		Control re travel	od		1
Inver	rod travel	rev/min (2		f control ever	rev/min	mm (	<b>(</b> •)	lever	rev/min	mm	(3)	rev/min	mm
1	2	3	1		5	6	_	7	8	9		10	11
max.	1250	15,2-17,8	3	•	•	-		ca. 18	100 350	min. 7,5-7			0,9-1,1 3,6-3,9
ca. 65	9,3	1280-1290	$\mathbf{J}$						550	(7,5-7	<b>,</b> ′	930	5,3-5,6
	4,0 1500	1360-1390 0 - 1,0						400-600				250	8,3
								<b>③</b>					

Torque control travel a =

mn

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of Control-roo Test oil ten		Rotational-speed (2b) limitation intermediate speed	Fuel deliv	very characteristics (5e peed (5b)	Starting Idle switching		Torque- travel	control 5
rev/min	cm³/1000 strokes	rev/min 49	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	travel mm
1230	100,0-102,0 (98,0-104,0		1230	73,0-75,0 (71,0-77,0)	100	110,0-130,0	•	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

\*\* Adjusted at the inner lever of the reduced-delivery stop.

2.83

BOSCH

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# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4MB 12,8 n 1 1. Edition

<u>En</u>

PE 8 P 100 A 320 LS 819- 1

RQV 350-1250 PA 378-2

1 - 8 - 7 - 2 - 6 - 3 - 5 - 4 je  $45 \circ ^{+} 0,5 \circ (^{+} 0,75 \circ)$ 

supersedes
Daimler-Benz
company:
engine: OM 402
188 kW (256 PS)
Komb.-Nr.
0 401 848 081

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Rotational speed	Control rod	Fuel delivery	Difference cm <sup>3</sup> /	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min 1	mm 2	cm <sup>3</sup> /100 strokes 3	100 strokes	mm 2	cm <sup>3</sup> /100 strokes	mm 6
1230	10,3+0,1	10,0-10,2	0,3(0,6)			
350	7,5-7,7	2,1-2,5	0,3(0,5)			
	•					

Adjust the fuel delivery from each outlet according to the values in \_\_\_\_\_\_\_.

#### **B.** Governor Settings

Testoil-ISO 4113

Upper rated s	speed		Intermediate	rated sp	eed	Lower rated	speed	•	Slidina s	leave travel
Degree of deflection of control lever	Control rod travel	Control rod (18) travel mm (28)	Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel	rev/min	1
1	2	3	4	5	6	7	8	9	10	11
max.	1250	15,2-17,8	•	•	-	ca.18		min. 9,2 7,5-7,7		0,9-1,1 3,6-3,8
ca. 65	9,3	1280-1290	İ				330	•	930	5,3-5,6
	4,0 1500	1360-1390 0 - 1,0				400-600			1250	8,3
						<b>3</b>				

Torque controi travel a =

mr

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-roi Test oil ten		Rotational-speed (2b) limitation intermediate speed			Starting Idle switching	. •	Torque- travel	control (5)
rev/min		rev/min 40	rev/mir.	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	travel mm
1230	100,0-102,0 (98,0-104,0)	1280-1290 *	1230	73,0-75,0 (71,0-77,0) **	100	130,0-150,0	•	•

Checking values in brackets

\*1 mm less control rod travel than col. 2

Adjusted at the inner lever of the reduced-delivery stop.

2.83

# Test Specifications Fuel Injection Pumps (1) and Governors

WPP 001/4 SCA 11,0 r

4. Edition

PE 6 P 110 A 720 RS 3040,

RQV 250-1100 PA 379 R

superseded 1.80 company: Scania

PE 6 P 110 A 720 RS 3041,

EP/RSV 350-1100 P 1/310 R

engine: DS 11 206 kW (280 PS)

Variations in output -sida 3!

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

3,30-3,40 Port closing at prestroke (3,25-3,45)

mm (from BDC)

RW 10.5

Off Growing Cripion	(3	,25-3,45/			C, 01 WA	
Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery 3040 + RQV cm·/100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery 3041 + RSV cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	13,0+0,1	15,5 - 15,7	0,4(0,8)	13,0	15,7 - 15,9	3,3 ± 0,1 **
600	13,0+0,1	15,6 - 16,0		13,0	16,1 - 16,5	(max. 7 0-3,5)
225	4,0-4,2	0,7 - 1,1	0,2(0,4)	350 3,7-3,9	0,7 - 1,1	

Adjust the fuel delivery from each outlet according to the values in [

\*\* In the case of greater dispersion alter the delivery-valve spring pre-tension

# B. Governor Settings

RQV ... 379 R

Upper rated s						Lower rated	speed		Stiding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm 2	Control rod travel mm rev/min 2a	deflection of control	rev <i>im</i> in 5	Control rod travel mm 4	Degree of deflection of control lever	revisia P	Control rod travel mm 3	rev/min	(1) mm 11
max.	1100 1460	15,2 - 17,8 0 - 1,0	-	•	-	ca. 10	100 225 310-	5,5 4,0-4,2 370 = 2,0	200 500 800 1100	1,0-1,2 3,8-4,1 5,4-5,6 8,0
ca. 61		1140-1150 1250-1280				<b>③</b>				

Torque control travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)			Fuel delivingh ide s	rery characteristics (58) peed (50)	Starting Idle switching	. •	Torque- travel	control 5
rev/min	cm <sup>3</sup> /1000 strokes .	rev/min 40	rev/min 4	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min 8	travel mm
LDA 1100	0,7 bar 155,0-157,0 (153,0-159,0)	1140-1150*	LDA 600 LDA 500	0,7 bar 156,5-159,5 (154,0-162,0) 0 bar 128,0-132,0 (126,0-134,0)	225 Dispe	240-290 0- 13 rsionmax. 2 (	- 4)**	_

Checking values in brackets

\*1 mm less control rod travel than col. 2

**B.** Governor Settings

					EP/RSV 310 R				
		Interme	diate rated	speed	<b>(1)</b>	Lowe			rque control
Control rod travel mm	Control rod travel mm rev/min				Control- lever deflection	rev/min	Control rod travel		Control rod travel
2	3	4	5	6	in degrees 7	8	9	10	11
1100	16,0				ca. 30	350	6.0		max.
1200		with	out au	xilia:	y sprin	100	min. 19		
1220-1	255 = 4,0		auxil	iary :	pring	350 400 550	5,7-6,3 3,2-4,7		
	Control rod travel mm 2 1100 1150 1200 1140-1	mm mm rev/min 2 3  1100 16,0 1150 11,7 1200 6,0  1140-1150 = 12 1220-1255 = 4,0	Control rod travel   mm   mm rev/min   2   3   4	Control rod travel mm rev/min 2 3 4 5  1100 16,0 11,7 without au 1140-1150 = 12 1220-1255 = 4,0	Control rod travel   mm rev/min   2   3   4   5   6	Control rod travel mm rev/min   2     Control rod travel mm rev/min   3   4   5   6   Control lever deflection in degrees   7	Control rod travel mm rev/min   2   3   4   5   6   Control-lever deflection in degrees   7   1100   16,0   11,50   11,7   1200   6   0   0   0   0   0   0   0   0	Control rod   Control rod travel   mm rev/min   2   3   4   5   6   6   7   Control rod travel   mm rev/min   3   6   0   11.7   1200   6   0   0   0   0   0   0   0   0	Control rod   Control rod travel   mm rev/min   2   3   4   5   6   7   Control rod travel   mm rev/min   3   4   5   6   7   Control rod travel   mm rev/min   10   11.7   1200   120

The numbers denote the sequence of the tests

### C. Settings for Fuel Injection Pump with Fitted Governor

	b Full-load stop  to oil temp. 40°C (104°F)  Rotational-speed limitat. Note:			nel delivery paractenstics	Starting I	fuel delivery 5	4a) lidle stop	
į .	cm³/1000 strokes	changed to) rev/min 3	rev/min	cm <sup>3</sup> /1000 strokes 5	rev/min	cm <sup>3</sup> /1000 strokes	rev/min 8	Control rod travel mm
1100	155,0 - 157,0 (152,0 - 160,0)	1140~1150*	600		350 ispers	20,5-21,0 9-13 ion max. 2 5,0 -5,5 m sion max. 4	(4) n RW** (7)	·

Checking values in brackets

\* 1 mm less control rod travel than col. 2

### D. Adjustment Test for Manifold Pressure Compensator

Test at n = rev/min decreasing pressure - in bar gauge pressure 500

Pump/governor			
r-ump/governor	Setting	Measurement	diminution
	Gauge pressure =	Gauge pressure = bar	Control rod travel-difference  XXXXXXXXX  mm (1)
PE 6 P RS 3040 + RQV PA 379 R	0,38	0,70 0 0,28	12,8 - 12,9 13,0 - 13,1 11,7 - 11,8 12,1 - 12,3

Notes:

(1) when n =

gauge pressure

bar (= maximum full-load control rod travel)

En

Increased or reduced outputs of the types listed on page 1-2:

Output variation	Output %	Fuel deli at pump s	very in	cm <sup>3</sup> /1000	strokes	Adjustment of control-rod position from 100%
Variation	A	1100	900	750	600	setting (mm)
Р	120	205	208	212	214	+ 2,6
ម	115	191	196	198	200	+ 1,9
R	113	186	191	192	195	+ 1,7
W	110	180	185	185	188	+ 1,3
٧	108	175	179	179	183	+ 1,0
¥	105	170	173	172	177	+ 0,7
T	173	166	167	166	171	+ 0,4
S	98	154	156	156	158	- 0,2
X	95	146	149	149	150	- 0,5
Q	93	141	145	145	146	- 0,8
Z	. 90	134	138	139	140	- 1,1
0	88	131	134	136	137	- 1,3
N	85	124	126	130	131	- 1,6
M	80	114	115	119	121	- 2,1
L	75	105	106	108	111	- 2,6
K	70	98	98	98	99	- 3,0
J	65	89	90	90	90	- 3,4
I	60	86	84	83	80	- 3,8

<sup>1)</sup> Tolerances with fuel quantity are  $\pm$  1 cm $^3$  at setting speed.

With subsequent orders from KH/ALP only the standard setting according to page 1-2 will be delivered. If required, the above mentioned variations are to be carried out through your local BOSCH Service Station.

The delivery amounts given in the table have been compiled from Saab-Scania documentation upon their request.

### **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 ALO 13.8 a 1. Edition

PES 6 P 120 A 320 RS 410 ROV 400-1050 PA 496 K Komb.-Nr. 0 402 046 201

supersedas

company:

Allis Chalmers

613.8 I engine:

355 PS

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings 2,8-2,9

Port closing at prestroke (2.75 - 2.95)

Fuel delivery

mm (nom 60C)			
Difference	Control rod	Fuel delivery ·	Spring pre-tensioning (torque-control valve)
cm <sup>3</sup> /	mm	cm <sup>3</sup> /100 strokes	mm

,	ev/min	mm 2	cm <sup>3</sup> /100 strokes 3	cm³/ 100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6
ſ	1050	11,7+0,1	23,3-23,5	0,4			
	400	6,0-6,2	2,5- 3,1	0,4			

Adjust the first delivery from each outlet according to the values in [

#### **B. Governor Settings**

Rotational speed | Control rod

Upper rated	speed			Intermediate	rated ap	•••4		Lower rated	speed			Siring a	leave travel
Degree of deflection of control		Control rod travel	U	Degree of deflection of control		Contro		Degree of deflection of control		Control re travel			0
lever 1	2	reviewe 3	<b>②</b>	lever 4	r <del>ov/mut</del> 5	<b>~</b>	•	lever 7	r <del>aw/ma</del> n 8	 9	<b>③</b>	r <del>ovincia</del> 10	11
ca.61	1050	15,2-17	,8	-	-		-	ca.17,		min.7		-	•
ca.59		1090-11 1205-12 0 - 1	35						465-	.525=2, max.1,	0		
								<b>③</b>					

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load di Control-roc Test oil ten				<b>9</b>		test debrery (8)	Torque travel	Combrol rad
rawhtten	cilli <sup>3</sup> /1000 strokes	review (4)	rendenia	cm³/1000 strokes	rendens	CH-Y1000 strokes	reviews	Tandi Tan
1	2	3	4	5	•	7	8	•
1050	233,0-235,0	1090-1100*	800	212,0-216,0	100	140,0-180,0	1050	11,7
							800	11,2+0,
			•					

icking values in brack

am less control rod travel then col. 2

3.83

Testoil-ISO 4113

# Test Specifications Fuel Injection Pumps ① and Governors

WWP 001/4 VOL 7,0 a 2 1. Edition

E:

PE 6 P 100/320 RS 169
(A)

RQV 200-1200 PA 122/2 R RQV 250-1200 PA 235/2 R company 701v0 TD 70 engine:

Testoil-ISO 4113

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Rotational speed	Control rod travel	Fuel delivery	Difference cm <sup>3</sup> /	Control rod traval	Fuel delivery	Spring pre-tansioning (forque-control valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	100 strokes	rum	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
1000	12,0	10,4-11,1	0,5			2,5-0,1 max. 2,2-2,9)
600 600	9,0 12,0 15,0	3,3-4,3 9,8-11,2 14,9-16,5				

Adjust the fuel delivery from each outst according to the values in \_\_\_\_

#### **B. Governor Settings**

#### .. PA 122/2 R

Upper reted s	peed		Intermediate	rated ap	eed	Lower rated	speed		Siring a	isava traval
deflection	Control	Tand O	Degree of deflection	demection   1		Degree of deflection		Control rod travel	. 0	
of control lever	rod travel	rev/man 2a	of control lever	rev/min	O	of control	reviene	<b>~</b> 3		
	4	3	•	-	•	/	8		10	11
ca. 68	1290 1550	15,0-18,0 0	-	-	-	ca. 23		8,6-10,0 6,4-8,8	1299	8,3
ca. 66	1200 1300	15,0-17,8 7,7-12,6				=	500	2,9-5,4 0,7-2,7		
	1400 1500	0 - 7,6					590	0		
						(3)				

Torque control travel a =

The State of

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of Control ro	d stop	Rotational appeal (20) innestion	Furt dain high idle t	rery characteristics (5e) peed (3b)	Idle	. •	Torque trevel	control (3)
rowhein	mp. 40°C (104°F) (2)	revitain (a)	rovinia	cm³/1000 strokes	revitada revitada	cm*/1000 strokes	1011/10mm	Control roc travel
1	2	3	4	5	6	7	8	9
LDA 700	0,7 bar 82,0-84,0 (81,0-85,0)	1230-1240*	LDA 700	0 bar 63,5-65,5 (62,5-66,5)	100 200 Fisper	150,0-180,0 11,0-15,0 sion max. 2,5	•	•

Chucking values in brackets

\* 1 mm ines control rod travel then cot. 2

Upper rated	speed		Intermediate	rated spe	<del>je</del> di	Lower rated	speed	1	Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod ta travel mm rev/min 2a	Degree of deflection of control lever	rev/min	Control rod travel mm 4	Degree of deflection of control lever 7	rev/min	Control rod travel mm 3	rev/min 10	mm 11
ca. 50	1290 1560	15,0-18,4 0	-	-	•	ca. 13	200			8,3
ca. 45	1200 1300 1400 1510	15,0-18,2 8,1-13,2 0 - 7,4 0				(3a)	300 380 510	3,8-6,8 0 -4,0 0		

Torque control travel a =

mm

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roo Test oil ten		Rotational-speed (20) limitation intermediate speed	character high side s	rstics	Starting Idle switchin	fuel delivery 6	Torque- travel	Control od
rev/min	cm <sup>3</sup> /1000 strokes	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	sev:min	cm:/1000 strokes 7	r <del>ev</del> /mm 8	<b>mm</b> 9
LDA 700	0,7 bar 82,0-84,0 (81,0-85,0)	1230-1240*	LDA 700	0 bar 59,5-62,5 (58,5-63,5)	1	15,0-180,0 11,0-15,0 sion max. 2,5	-	

Checking values in brackets

\* 1 inm less control rod travel than co: 2

# Testoil-ISO 4113

#### D. Adjustment Test for Manifold Pressure Compensator

Test at n =

revimm decreasing pressure - in ber gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference	
	Gauge pressure = ber	Gauge pressure = bar	mun.	
PE 6 P RS 169 + RQV PA 122/2R bzw. + RQV PA 235/2 R		0,07-0,11		

En'

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 VOL 7,0 i
3. Edition

PE6P110A320RS413 Y

ROV 250-1200 PA 499

company: Tr. 70

Komb.-Nr. 0 401 846 439

TD 70 F engine: 180 kW (245 PS)

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

3,0-3,1 fort closing at prestroke (2,95\_3,15)

mm (from BDC) = RW 9,0 - 12,0 mm

Port Closing at pres	(2	2.95-3.15)	thin (montable) 11 330 1230 man							
Rotational speed	Control rod travel	Fuel delivery	Difference cm <sup>3</sup> /	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)				
rev/min	mm	cm <sup>3</sup> /100 strokes	100 strokes	mm	cm <sup>3</sup> /100 strokes	mm				
1	2	3	4	2	3	- 6				
700	12,4+0,1	12,9-13,1	0,4(0,8)			2,5 ±0,1				
250	4,9-5,1	1,6- 2,0	0,3(0,6)	è		(max. 2,2-2,9)				

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Testoil-ISO 4113

Upper reted s	pood		Intermediat	rated ap	ood		Lower rated	speed		Stictions	leveri eveel
Degree of deflection	rev/rein Control	Control rod (	Degree of deflection		Contro	irod	Degree of deflection	}	Control rod travel		. ①
of control lever	rod travel	mm rev/min (2	of control	rev/min	mm	<b>(</b> •)	of control lever	rev/min	(	3) rev/min	mm
1	2	3	4	5	6		7	8	9	10	11
max.	1200	15,2-17,	3 -	-		-	ca. 9		min.6,4		8,0-6,0
ca.62	11,4	1240-125	,					256	14,2-5,1	530   870	3,1-3,5 5,6-5,9
Ca.02	4.0	1370-149			1					1200	
1	1500	0 - 1,0			l		309-419	1			
			l				<b>③</b>				

Torque control travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test of ter	d stop	Rotational speed (20) iumitation stermediate speed	Fuel delivings also	ery characteristics (Se)	Starting idle switchir		Torque- travel	Control C
rev/min	c/h³/1000 strokes .	roumin @	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm3/1000 strokes	rev/min	
1	2	3	4	5	6	7	8	9
LDA	0,7 bar	1240-1250*	LDA	0 bar	100	160,0-200,0	-	-
700	129,0-131,0		700	78,0-81,0		= R4 20,0-		
	(126,0-134,0			(75,0-84,0)		21,0 mm		
		,						

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Test at n =

500

rev/min decreasing pressure – in bar gauge pressure

VOL 7,0 i

Pump/governor	Setting  Gauge pressure = bar	Measurement  Gauge pressure = bar	diminution Control rod travel- difference mm (1)
413 Y + 499	0,7	0,51 0,30 0	12,4 - 12,5 12,0 - 12,1 10,7 - 10,9 9,8 - 9,9

Notes

(1) when n =

rev/min and gauge pressure =

### **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 KHD 19,0 n

1. Edition

PE 12 A 95 D 610 LS 2453 RQV 750 AB 996 L 1 - 4 - 9 - 8 - 5 - 2 - 11 - 10 - 3 - 6 - 7 - 12  $0 - 15 - 60 - 75 - 120 - 135 - 180 - 195 - 240 - 255 - 300 - 315^{0} + 0,5^{0}$ 

supersedes\_

company: KHD

engine: F 12 L 413 F

Komb.-Nr. 0 400 640 094  $(+0.75^{\circ})$ 

All test specifications are valid for Boech Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings 2,0 - 2,1

Port closing at pres	proke	(1.95-2.15)	mm (from 3DC)			
Rotational speed	Control rod travel	Fuel delivery	Difference cm <sup>3</sup> /	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min 1	mm 2	cm <sup>3</sup> /100 strokes 3	100 strokes	mm 2	cm <sup>3</sup> /100 strokes 3	enen 6
710	9,5-9,6	8,0 - 8,2	0,3(0,6)			
300	5,6-5,7	0,4 - 0,9	0,3(0,5)			

Adjust the fuel delivery from each outlet according to the values in [

#### **B. Governor Settings**

Testoil-ISO 4113

Upper rated s	peed		Intermedials	rated sp	eed	Lower rated	speed	•	Siding s	leeve traval
		Control rod travel	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel		. ①
	rod travel	men rev/mun (2a)	of control lever	revimin	mm (1)	of control lever	revimon	mm (3)	rev/min	mm
7	2	3	4	5	6	7	8	9	10	11
ca. 27	9,0 4,0	750-755 770-785		•	•	-	•	-	•	•
						<b>9</b>				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load di Control-roi Test oil ten		Rotational-speed (20) imutation intermediate speed	Fuel deliningh alle s	ery characteristics (Se peed (Se)	Starting Idle switchir	. •	Torque- travel	control (5) Control rod
Law Luniu	cds <sup>3</sup> /1000 strokes .	rev/men 40	rev/min	cm <sup>2</sup> /1000 strokes	revitnin	cm-V1000 strokes	rev/min	mm .
1	2	3	4	5	•	7	8	9
710	79,5-81,5 (77,5-83,5)	750-755*	,	•	100	120,0-130,0 = 13,8-14,5 mm RW	•	-

Chucking values in brackets

0,5

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 KHD 19,0 m

1. Edition

PE 12 A 95 D 610 LS 2453 Komb.-Nr. 0 400 640 108

RQV 300-900 AB 1090 L

supersedes \_

company: KHD

F 12 L 413 FW

177 kW (240 PS) 1800 min

1 - 4 - 9 - 8 - 5 - 2 - 11 - 10 - 3 - 6 - 7 - 12 0 - 15 - 60 - 75 - 120 - 135 - 180 - 195 - 240 - 255 - 300 - 315 - 0,50 (± 0,750)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Testoil-ISO 4113

(1.95-2.15)

Rotational speed ray/min		Fuel delivery cm <sup>3</sup> /10C strokes 3	Difference cm <sup>2</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
900	8,9-9,0	7,2 - 7,4	0,35(0,6			
300	5,9-6,1	1,4 - 2,0	0,35(0,5	5)		
1			ļ			

Adjust the fuel delivery from each outlet according to the values in [

#### **B. Governor Settings**

Upper raied s	peed			Intermedials	rated ap	ed.		Lower rated	speed		Sidings	leve's evec
	rev/men Control	Control rod		Degree of defection		Control ro	d	Degree of deflection		Control rod travel		0
	rod trave		(a)	of controt	rev/men	commo	<b>①</b>	of control lever	rev/min	mm (3	) rev/mm	ren
1	2	3		4	5	6		7	8	9	10	11
max.	900	15,2-	17,8	-	-	-		ca. 24	100	min.7,	250	0,5-0,7
	7.0	040	050						300	5,9-6,	470	4,0-5,2
ca. 59	7,9	940-1 990-1							340-4	100 = 2,0	680	6,2-6,5
	1100								ļ		900	8,2
								<b>②</b>			1	

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-rod Test oil terr	stoo ~	Rotational speed 20 irmitation stansactiate speed	Fuel delivingh site 3	ery cherecteristics (5a) peed (3b)	Starting lidle switching		Torque-	Control roc
rev/min		rev/min 4	rev/min	cm <sup>3</sup> /1000 strokes	røv/min	cm <sup>2</sup> /1000 strokes	rev/min	travel mm
900	71,5-73,5 (69,5-75,5)	940-950*	750 850	80,5-83,5 (78,0-86,0) 72,5-75,5	100	19,0-21,0 mm RW	900 400 750 850	8,9+0 9,6+0 9,2+0 9,0+0
				(70,0-78,0)			030	3,010

Chucking values in brackets

\* 1 mm less control rod travel than col. 2

# **Test Specifications** Fuel Injection Pumps 1 WPP 001/4 MB 11,0 m and Governors

2. Edition

Testoil-ISO 4113

PE 6 P 110 A 320 LS 3814

ROV 350-1150 PA 378

supersedie 81 companyDaimler Benz engine: 011 421 159 kW (216 PS)

6 - 3 - 5 - 2 - 4 - 1 0 -45 -120-165-240-285 °±0,5°(±0,75°)

Komb.-Nr. 0 401 846 741

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at pres	troke	4,00-4,10	mm (from BDC)	W 9,0-1	2,0 mm	
Rotational speed	Control rod travel	Fuel delivery	Difference cm <sup>3</sup> /	Canizal rad <b>Irava</b> l	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min 1	mm 2	cm <sup>3</sup> /100 strokes 3	100 strokes	mm 2	cm³/100 strokes 3	mm 6
1130	12,7+0,1	13,5-13,7	0,4(0,8)			
350	8,2-8,4	1,3 - 1,9	0,4(0,7)		·	

ery from each outlet according to the values in [

#### **B. Governor Settings**

Upper rated a	peed		memedial	qe beter e	eed	Lower rated	speed	•	Sliding s	leeve travel
		Control rod (	Degree of defection		Control rad	Degree of deflection		Control rod travel		$\odot$
of control	rod travel		of control	nev/min	mm (4)	of control	rev/min	mm 3	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
max.	1130	15,2-17,8				ca. 14		min.8,5 7,0-7,2	300 670 1500	1,1 3,9-4,1 8,4
ca. 66		1170-1180 128 -1310 0 - 1,0			·	375-485 ③				

Torque control travel a -

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load di Control-roi Test oil ten	d stop	Rotational-speed (20) Irratation Intermediate speed	Fuel definition to	very characteristics (5e)	Starting lidle switching	. —	Torque- travel	Control rod
rev/min		rev/min 😉	rev/man	cm <sup>3</sup> /1000 strokes	rev/men	cm <sup>3</sup> /1000 strokes	rev/min	travel men
1130	135,0-137,0 (132,5-139,5	1170-1180*			100	130, 0-150, 0		

Chucking values in brackets

\* 1 mm less control rod travel than col. 2

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 SCA 8,0 i 1

1. Edition

PE 6 P 110 A 720 RS 3034 Z

RQV 200-1200 PA 554

Komb.-Nr. 0 401 846 770

supersedes\_

company: Saab Scania

engine: DS8 05

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

otational speed	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
700	11,8+0,	10,1 - 10,3	0,4(0,8)			25 ± 0,1
225	5,3-5,9	1,5 - 1,9	0,3(0,5)			(2,2 - 2,9)

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated s	speed		Intermediate	rated sp	⇔d	Lower rated	speed	4	Sliding s	Sliding sleeve travel	
	rev/min Control	Control rod travel	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel	. 0		
of control lever	nod travel	rev/min (2a)	of control lever	rev/min	mm (4)	of control lever	rev/min	mm 3	rev/min	mm	
1	2	3	4	5	6	7	8	9	10	11	
max.	1220	15,2-17,8	-	-	-	ca. 16	100	min.7,4	150	0 -1,0	
ca. 61	10,8 4,0 1500	1240-1250 1360-1390						5,9-6,1		5,4 <b>-</b> 3,9	
	11300	0 - 1,0			i		410-4	70 = 2,0	200	7,9	
						<b>③</b>					

Torque control travel a =

min

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) 2		Rotational speed 20 fimitation intermediate speed	Fuel definingly idea	part (Se)	Starting idle switchtr	. •	Torque- travel	control (5) Control rod
rev/min	cm <sup>3</sup> /1000 strokes .	rev/min 40	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	travel mm
1	2	3	4	5	6	7	8	9
L0A 700	0,9 bar 101,0-103,0 (99,0-105,0)		LDA 1200 LDA 500	0,9 bar 111,5-114,5 (109,5-117,0) 0 bar 85,0-89,0 (83,0-91,0)	100	190,0-240,0 = 20,0-21,0 mm RW	7	•

Checking values in brackets

\*1 mm less control rod travel then col. 2

2.83



Testoil-ISO 4113

#### D. Adjustment Test for Manifold Pressure Compensator

SCA 8,0 i 1

Test at n =

500

rev/min decreasing pressure ~ in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 6 PRS 3034 Z + RQVPA 554	0,90	0 0,21	11,8 - 11,9 10,9 - 11,0 11,7 - 11,8

Notes.

(1) when n =

rev/min and gauge pressure =

WPP 001/4 VOL 3,6k

in

VE 4/10 F 1900 L 109

0 460 404 029

superseder Volvo-Penta company: 8199

1. Edition

engine: 70 PS-B-Leistung

Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

0,2

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. Did de (kgf/cm²)	
1.1 Timing device travel	1500	4,4-4,8	mm		
1.2 Supply pump pressure	1500	6,9-7,5	bar (kgf/cm²)		
1.3 Full-load delivery without charge-air pressure Full-load delivery with charge-air pressure 1.4 Idle speed regulation 1.5 Start  1.6 Full-load speed regulation	1500 300 ,100 2100	43,0-44,0 - 20,5-24,5 min. 60,0 24,5-30,5	cm³/1000 strokes cm³/1000 strokes cm³/1000 strokes cm³/1000 strokes cm²/1000 strokes		3,0
1.7 Load-dependent start of delivery					

2. Test Spec	cifications	checking values in brackets (	)		
2.1 Timing device	n = rev/min mm	1000 1,8-2,6 (1,5-2,9)	1500 (3,9 - 5,3)	5,1-5,9	1900 (4,8-6,2)
2.2 Supply pump	n = rev/min ber (kgf/cm²)	600 3,7 - 4,3		8,3	1900 - 8,9
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	600 55 - 138 (40 - 153	3)	55-138	1900 (40-153)
2.3 Fuel deliveries Speed control lever	Rot. speed	Fuel delivery	Charge-air press. ber (kgf/cm²)	3. Dimen	SionS for assembly and adjustment mm
End stop	2350 2300 2100 1900 1500 800 600	max. 4,0 1,0-9,0 (1,0-9,0)		k KF MS SVS	- 5,7-6,0 1,4-1,6 max. 4,2
switch-off	1900	0		8	
ide stop  End stop	300 400 450 350 450	(18,5-26,5) 0,5-6,5 max. 2,5 min. 50 max. 48		Observations	

BOSCH

2.4 Solenoid

mex. cut in voltage

Reschafts bereich KH. Kundendienst. KIz-Ausrüstung. C. 1980 by Robert Boech GmbH. Postfach SO, D-7000 Stuttgart 1. Printed in the Federal Republic of Germany 1...83

VE 6/10 F 2000 L 115

WPP 001/4 VWW 2,4 g 1. Edition

supersedes VWW company:

50 Hz. Aggr.

0 460 406 015

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

see VDT-W-460/...

Testoil-ISO 4113

1. Settings	Rot. speed rev/min	Settings	· ·	Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1200	2,2 - 2,6	mm		
1.2 Supply pump pressure	1200	4,4 - 5,0	bar (kgf/cm²)		
1.3 Full-load delivery without	1200	30,5 -31,5	cm <sup>3</sup> /1000 strokes		2,5 (3,0)
charge-air pressure Full-load delivery with	-	-	cm <sup>3</sup> /1000 strokes		
charge-air pressure 1.4 Idle speed regulation	350	6,0 -10,0	cm <sup>3</sup> /1000 strokes		2,5 (3,0)
1.5 Start	<i>=</i> 100	min. 35,0	cm³/1000 strokes		
1.6 Full-load speed regulation	2070	8,0 -14,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery		-			

1 Timing device	o = rev/min	900	1200		1950			
, I mining Genice	mm	1,3-2,1 (1,0-2,4)	(1,7-3,		5,0 (3,9-5,3			
2 Supply pump	n = rev/min	600		1950 6,4-7,0				
	bar (kgf/cm²)	2,8-3,4						
Overflow delivery	n = rev/min	600			1950			
	cm <sup>3</sup> /10 s	55-138 (40-153)			38 (40-153)			
2.3 Fuel delivenes				3. Dimen	SIONS for assembly and adjustment			
Speed control lever	Rot. speed rev/min	Fuel delivery cm³/1000 strokes	Charge-air press. bar (kgf/cm²)	Designation	mm			
End stop	2150	max. 1,5		K	3,2-3,4			
	2070	(7,0-15,0)		KF	6,3-6,6			
	2050	13,0-19,0 (12,0-20,0)		MS	1,4-1,6			
	1950	22,5-24,9 (21,4-26,0)		svs	2,7			
	1200	(28,7-33,3)						
	600	23,0-26,0 (21,5-27,5)						
switch-off				A				
elect.	400	0		8				
idle stop	430	max. 1,5		Observations				
	350	(4,0-12,0)						
End stop	350	min. 30						
	450	max. 30						
2.4 Solenoid	max. cut-in volte	mated voltage 12V						

44

WPP 001/4 VWW 2,4 g1 1. Edition

En

VE 6/10 F 1800 L 115-1 O 460 406 016

Testoil-ISO 4113

supersedes \_

company: VWW

ingine: 50 Hz

50 Hz. Aggr.

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting - m

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings	Settings		Difference in delivery cm <sup>3</sup>
1.1 Timing device travel 1.2 Supply pump pressure 1.3 Full-load delivery without charge-air pressure	1200 1200 1200	2,3- 2,7 4,4- 5,0 30,5-31,5	mm bar (kgf/cm²) cm³/1000 strokes		2,5 (3,0)
Full-load delivery with charge-air pressure 1.4 Idle speed regulation 1.5 Start 1.6 Full-load speed regulation 1.7 Load-dependent start of delivery	350 100 1830	5,0-11,0 min. 35,0 17,0-23,0	cm³/1000 strokes cm³/1000 strokes cm³/1000 strokes cm³/1000 strokes		2,5 (3,0)

2. Test Spe	2. Test Specifications checking values in brackets ( )								
2.1 Timing device	u = tev/wiu	900	1200	1750					
	mm	1,1-1,9 (0,8-2,2)	(1,8-3,2)	4,0-4,8 (3,7-5,1)					
2.2 Supply pump	n = rev/min	600		1750					
	bar (kgf/cm²)	2,7-3,3		5,8-6,4					
Overflow delivery	n = rev/min	600		1750					
	cm <sup>3</sup> /10 s	55-138 (40-153)		55-138 (40-153)					
		<u> </u>							

	cm <sup>3</sup> /10 s	55-138 (40-153)		55-13	38 <i>-</i> (40 <b>-</b> 153)		
2.3 Fuel deliveries		<u></u>		3. Dimensions for assembly and adjustment			
Speed control lever	Rot. speed rev/min	Fuel delivery cm³/1000 strokes	Charge-air press. bar (kgf/cm²)	Designation	mm		
End stop	1950	max. 1,5		K	3,2-3,4		
	1880	min. 5,0		KF	6,3-6,6		
	1890	(16,0-24,0)					
	1750	25,3-27,7 (24,2-28,8)		MS	1,4-1,6		
	1200	(28,7-33,3)		svs	2,7		
	600	23,0-26,0 (21,5-27,5)			•		
switch-off				A			
elect.	400	0		8			
idle stop	430	max. 1,5		Observations			
	350	(4,0-12,0)					
End stop	350	min. 30					
١	450	max. 30					
2.4 Salenaid	max. cut-in voltag	mated voltage 12V					

Testoil-ISO 4113

# Test Specifications Fuel Injection Pumps ② and Governors

40

WPP 001/4 MB 14,5 h 3 1. Edition

<u>En</u>

PE 8 P 120 A 320 LS 3807

RQ 750 PA 374 R

1 - 8 - 7 - 2 - 6 - 3 - 5 - 4 je  $45^{\circ} - 0.5^{\circ} (-0.75^{\circ})$ 

supersedes =

company: Daimler-Benz

engine: OM 422 A

196 kW (266 PS)

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

All test apecifications are valid for Bosch Fuel Injection Pump Test Benches and Testers,

#### A. Fuel Injection Pump Settings

Port closing at prestroke (3,95-4,15) mm (from BDCZy1. 8

		3,334,13			T	
Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokés 3	Ditterence cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	11,5÷0,	17,8 - 18,0	0,5 (0,9	<u> </u>		
300	5,0-5,2	1,2 - 1,8	0,8 (1,2	)		

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checking PRG che	g of slider . ck Control rod	Full-loa Setting	d speed re point Central		cifications (4)	Idle spec Setting p		Test spe	cifications 5	Torque o	Control rod
rev/min	travel	revimir 3	red trend	red trees	rev/min 6	rev/min 7	red transi mm 8	rev/min 9	travel mm 10		travel mm 12
-	-	-	•	10,5	750-755 785-795	•	•	•	-	•	-

Torque-control travel
on flyweight assembly dimension a \*\*

mm

Speed regulation: At

1 mm less control levert bor

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d governor of Test od ter	elivery on control lever np. 40°C (104°F)	Control rod stop	Fuel deliv	ory characteristics	Starting fi	d Control red trade
r <b>e</b> v/min 1	cm <sup>3</sup> /-1000 strokes	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes/mm 7
700	178,0-180,0 (175,0-183,0)	-	•	•	100	200,0-210,0

Checking values in brackets

10.82

BOSCH

# Test Specifications Fuel Injection Pumps (1) and Governors

WPP 001/4 VOL 12,0 f 3

1. Edition

Er

PE 6 P 120 A 320 RS 3071 Y RQV 250-1025 PA 371

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

companifolivo engine: TD 120 G 213 kW (290 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings 2,6-2,7

Port closing at pres	troke	2.55-2.75)	mm (from BDC)			
Rotational speed	Control rod travel	Fuel delivery	Difference cm <sup>3</sup> /	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min 1	mm 2	cm <sup>3</sup> /100 strokes 3	100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6
700	10,2+0,1	17,5-17,8	0,6(0,9)			
250	5,7-5,9	2,2-2,6	0,3(0,6)			
	ļ					

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Testoil-ISO 4113

Upper rated a	peed		Intermediate	rated sp	eed	Lower rated	speed		Sliding	leeve travel
deflection	Control	Control rod travel	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel		. ①
of control lever	rod travel	rev/min 2a	of control	rev/min 5	mm 4	of control lever	rev/min 8	mm 3	rev/min	mm 11
<u> </u>	-	3	-	-	6	<del> </del>	-	-	10	
max.	1100	15,2-17,8	-	-	-	ca.12		min.7,2 5,7-5,9		0,7 <b>-</b> 0,9 2,7 <b>-</b> 3,0
ca. 42	9,2 4,0 1300	1065-1075 1145-1175 0-1,0						90=2,0		4,7 <b>-</b> 5,0 6,9
						<b>②</b>			<u></u>	

Torque controi travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ten	d stop	Rotational-speed (20) limitation intermediate speed	Fuel deliv	rery characteristics (5e) peed (5b)	Starting Idle switching	. •	Torque- travel	control 5
rev/min	cm³/1000 strokes .	rev/min 40	rev/min	cm <sup>3</sup> /1000 strokes	r <del>ev</del> /min	cm <sup>3</sup> /1000 strokes	rev/min 8	travel mm
LDA 700	0,75 bar 175,0-178,0 (172,0-181,0)	1065-1075*	LDA 700	0 bar 155,0-159,0 (152,0-162,0)	100	240,0-280,0 =RW 20,0- 21,0 mm	•	•

Checking values in brackets

\* 1 mm less control rod travel then col. 2

#### D. Adjustment Test for Manifold Pressure Compensator

Test at n =

500

rev/min decreasing pressure ~ in bar gauge pressure

-2-VOL 12,0 f 3

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE 6 PRS 3071 Y +RQVPA 371	0,29	0,75 0 0,24	9,9-10,0 10,2-10,3 9,2-9,3 9,5-9,7

Notes:

(1) when n =

rev/min and gauge pressure =

# **Test Specifications** Fuel injection Pumps 1 and Governors

WPP 001/4 RVI 9,8 b 1

1. Edition

PE 6 P 120 A 321 RS 438

ROV 275-1200 PA 648

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

supersedes.

company:RVI engine: MID 062045

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

# A. Fuel injection Pump Settings 3,5-3,6

P	ort closing at pres	troke	(3.45-3.65)	mm (from BDC)			
	Rotational speed		Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
	rev/min 1	mm 2	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> / 100 strokes 4	mm 2	cm <sup>3</sup> /1 <b>00</b> strokes 3	mm 6
t	1200	11,2+0,	13,4-13,7	0,5(0,9)			
	275	5,3-5,5	0,7-1,3	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in [

#### **B. Governor Settings**

Upper rated s			_	Intermediate	rated spe	ed Control rod	Lower rated Degree of	speed	Control rod	Sliding sleeve travel	
deflection	rev/min Control rod travel mm	Control rod travel mm rev/min	0	Degree of desection of control lever	_	travel	deflection of control	rev/min 8	travel mm 3 9	rev/min 10	mm 11
max.	1230	15,2-17	,8	-	-	-	ca. 11	100 275	min.6,9 5,3-5,5	250 570	0-0,9 4,7-5,0
ca. 65		1240-12 1335-13 0-1,	65				270 <b>-</b> 365			880 1200	6,1-6,3 8,3
							<b>②</b>				

Torque control travel a =

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ter	d stoo	Rotational-speed (20) limitation intermediate speed	Fuel deliv high idle s	ery characteristics (50 peed (50)	Starting Idle switching		Torque- travel	Control rod
rev/min		rev/min 49	rev/min	cm <sup>9</sup> /1000 strokes 5	rev/min	cm³/1000 strokes 7	rev/min 8	mm 9
1200	134,0-137,0	1240-1250*	-	-	100	180,0-200,0	-	-
	(131,0-140,0)				275	7,0-13,0		
					<u> </u>		<u></u>	<u> </u>

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 GUS 21,2 a 2. Edition

estoil-ISO

PE 8 P 130 A 520/4 RS 3085

ROV 350-900 PA 602

supersedeg. 81 company Guascor engine: E 212

 $1 - 2 - 4 - 5 - 6 - 3 - 7 - 8 \text{ je } 45^{\circ} \pm 0.5^{\circ} (\pm 0.75^{\circ})$ 

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test

tubing 1 680 750 067.

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers.

#### A. Fuel Injection Pump Settings

ı	Port closing at pres	troke	3,2 - 3,3 (3 15-3 35)	mm (from BDC)			
	Rotational speed	Control rod	Fuel delivery	Difference	Control rad travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
	rev/min 1	mm 2	cm <sup>3</sup> /100 strokes 3	cm <sup>3</sup> / 100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6
	900	8,5-8,6	18,8 - 79,1	0,5(0,9)			
	350	4,0-4,2	2,2 - 2,8	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in [

#### **B.** Governor Settings

Upper rated s	1	1	Intermediate	rated sp	h	Lower rated	speed	la	Sliding s	leeve travel
Degree of deflection of control lever	rev/min Control rod travel mm 2	travel 🕓	Degree of deflection of control lever	rev/min 5	control rod travel mm 4	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 3	rev/min 10	mm 11
max.	950 1100	15,2-17,8 0 - 1	-	-	-	ca.10	100 350	min.5,6 4,0-4,2		1,0-1,2 2,8-3,2 4,7-5,1
ca. 58	7,5 4,0	940 - 950 965 <b>-</b> 995				355-455 ③			900	7,8

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of Control-ro Test oil ten		Rotational-speed 20 limitation intermediate speed	Fuel delin high idle s	rery characteristics (5e)	Starting Idle switchin	. —	Torque- travel	Control rod
rev/min	cm³/1000 strokes	rev/min 44	rev/min	cm <sup>3</sup> /1000 strokes	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	travel mm
900	188,0-191,0 185,0-194,0)	940 - 950*	-	-	100	19,5 - 21,0 mm RW	-	•

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

## **Test Specifications** Fuel Injection Pumps (2) and Governors

WPP 001/4 MB 14,6 i 3. Edition

PE 8 P 120 A 320 LS 3807

RO 300/1150 PA 511

supersedes 3.82

company:

Damiler-Benz

OM 422 LA 276 kW(375 PS)

1-8-7-2-6-3-5-4 je  $45^{\circ} \pm 0.5^{\circ} (\pm 0.75^{\circ})$ Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test

tubing 1 680 750 067.

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

# A. Fuel Injection Pump Settings

Port closing at prestroke

(3.95-4.15)

mm (from BDC) Zv1. 8

Rotational speed rev/min 1	Control rod travel mm 2	rel cr		Control rod travel mm 2	Fuel delivery cm <sup>2</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
900 300 1150/600 500	11,6+0, 4,8-5, 11,6+0,1 10,1+0,1	0 1,2-2,0 C, Sp.2 u. 5	0,5(0,9) 0,8(1,2) 0,75(1,2) 0,75			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checkin	g of slider	Full-load s		•	cifications 4	Idle spec	•		cifications (5)	Torque d	control 3
rev/min 1	Control rod	rev/min 3	Centrel red travel mm	Central red travel mm 5	rev/min	rev/min	Control red travel		Control rod travel mm		Control rod travel mm
600	19,1-20,8	600	20,0	10,7	1190-1205	300	4,3	100	min.6,0	-	•
VH =	max. 46°		·	4,0	1250-1280			300	4,2-4,4		
				1350	0 - 1,0			335 -	375=2,0		
Torque-c	control travel	L	<u> </u>				1	190-1	205 min 1	L	1 mm less control

Torque-control travel
on flyweight assembly dimension a =

Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

elivery on control lever pp. 40°C (104°F)	Control rod stop 3a	Fuel deliv	ery characteristics 36		d G
cm <sup>2</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm³/-1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes:/ mm
0,7 bar 189,0-191,0 (186,0-194,0)	-	LDA 600	0,7 bar 182,0-186,0 (179,0-189,0)	100	140,0-160,0
0,7 bar 185,0-189,0 (182,0-192,0)		LDA 500	0 bar 139,0-141,0 (136,0-144,0)		
į	0,7 bar 189,0-191,0 (186,0-194,0) 0,7 bar 189,0-191,0 (186,0-194,0) 0,7 bar 185,0-189,0	ontrol lever 10. 40°C (104°F)  cm²/-1000 strokes 2  0,7 bar 189,0-191,0 (186,0-194,0) 0,7 bar 185,0-189,0	ontrol lever 10. 40°C (104°F)  cm²/-1000 strokes 2  0,7 bar 189,0-191,0 (186,0-194,0) 0,7 bar 185,0-189,0  (2)  rev/min 3  LDA 600  LDA 500	ontrol lever (2) (3a) (3b) (2m²/-1000 strokes 2 rev/min 3 rev/min 4 cm³/-1000 strokes 5 (2m²/	Cm <sup>2</sup> /-1000 strokes   rev/min   cm <sup>2</sup> /-1000 strokes   rev/min   cm <sup>2</sup> /-1000 strokes   rev/min   cm <sup>2</sup> /-1000 strokes   rev/min   6     100     189,0-191,0   (186,0-194,0)   (186,0-194,0)   (179,0-189,0)   LDA   0 bar   185,0-189,0   139,0-141,0     139,0-141,0     139,0-141,0     139,0-141,0     139,0-141,0     140

Checking values in brackets

2.83

BOSCH

ENH

#### D. Adjustment Test for Manifold Pressure Compensator.

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

MB 14,6 i

Pump/governor	Setting	Measurement	diminution Control rod travet- difference
	Gauge pressure ≈ bar	Gauge pressure = bar	mm (1)
PE 8 P LS 3807	0,44		11,1-11,3
+ RQ PA 511		0,70	11,6-11,7
		0	10,1-10,2
		0,34	10,5-10,7
•			

Notes:

(1) when n =

rev/min and gauge pressure =

Testoil-ISO 4113

### Test pecifications Fuel Injection Pumps (2) and Governors

WPP 001/4 MB 21,9 d 1. Edition

PE 12 P 120 A 320 LS 3819-2

RQ 300/1050 PA 656

supersedes-

1 - 5 - 9 - 8 - 3 - 4 - 11 - 10 - 2 - 6 - 7 - 12

company: Daimler-Benz OM 424 LA

0 -15 -60 -75 -120-135-180-195-240-255-300-315° ±0,5° (±0,75° engine:

441 kW

Values only apply to test nozzle-and-holder

Komb.-Nr. 0 401 840 713

assembly 1 688 901 019 and fuel-injection test

tubing 1 680 750 067.
All test adecisions are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

(3.95-4.15)

mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1050	11,8+0,	19,2-19,4	0,5(0,9)			
300	5,0-5,2	1,4-2,0	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checkin PRG che		Full-load Setting po		-	critications (4)	Idle spec			cifications (5)	Torque	-	<b>3</b>
rev/min	Control rod travel mm	rev/min 3	Central red travel rnm 4	Custral real travel m/m 5	rev/min 6	rev/min 7	Control red travel rhom 8	rev/min 9	Control rod travel mm	rev/min	Control rod	<u>e</u>
600	19,1-20,8	600	20,0	10,8 4,0 1300	1095-1110 1165-1195 0-1,0		4,6	100 300 340-3	min.6,0 4,5-4,7 80 = 2,0	-	-	
Forque c	ontrol travel						10	095-11	10 min-1		1 mm less co	<b>Mir</b> o

Torque-control travel
on flyweight assembly dimension a = Speed regulation: At C. Settings for Fuel Injection Pump with Fitted Governor

governor	felivery on control lever mp. 40°C (104°F)	Control rod stop	Fuel deliv	ery characteristics 35	Starting f	tuel delivery 6
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes	rev/min 6	cm <sup>3</sup> /1000 strokes:/ mm
LDA 1050	0,6 bar 192,0-194,0 (189,0-197,0)	•	LDA 500	0 bar 141,0-143,0 (138,0-146,0)	100	170,0-190,0 (166,0-194,0)

3.83

rod travel

### D. Adjustment Test for Manifold Pressure Compensator

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

MB 21,9 d

Pump/gavernor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE12PLS3819-2 + RQPA656	0,60		11,8 - 11,9
+ KQ		0	10,8 - 10,9
		0,43	11,4 - 11,5
		0,38	11,1 - 11,3

Notes.

(1) when n =

rev/min and gauge pressure =

# **Test Specifications** Fuel Injection Pumps 2 and Governors

WPP 001/4 FIA 13,8 a 2

2. Edition

PE 6 P 120 A 720 RS 167

RO 225/1100 PA 336 R

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

10.80 superŝédes Fiat

company: 8210.12.275

154,5 kW (210 PS) engine:

Komb.-Nr. 0 401 846 429

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

Rotational speed rev/min		Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	10,3+0,1	16,3 - 16,6	0,5(0,9)			
225	7,5-7,7	1,7 - 2,3	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

**B. Governor Settings** 

PRG che	Control rod travel	Full-load s Setting po rev/min 3		Test spec Central red travel	rev/min	Idle spec Setting p rev/min 7	coint Centrel red travel	Test spe	cifications 5 Control rod travel mm		Control rod (3)
550	15,6-16,4	550	16,0	9,3	1145-116	225	5,3	100 225	" "	1100 550	10,3-10,4 10,3-10,5
1300	0 - 1			4,0	1190-122				355 =2,0		

Torque control travel

Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d governor d Test oil ter	letivery on control lever np. 40°C (104°F)	Control rod stop	Fuel deliv	ery characteristics	Starting fi idle spee	Control
rev/min	cm <sup>3</sup> /~1000 strokes 2	rev/min 3	rev/min 4	cm³/-1000 strokes 5	r-v/min 6	red travil cm <sup>3</sup> /1000 strokes / mm 7
1100	163,0 - 166,0 (160,0 - 169,0)				1.00	19,5-21,0 mm R
					225	5,3

Checking values in brackets

# Test Specifications Fuel Injection Pumps ② and Governors

FIA 13,8 a 4 2 Edition

En

PE 6 P 12U A 720 RS 167 Z Komb.-Nr. 0 401 846 225 RQV 225/1100 PA 118 R

supersed 81 company Fiat 221

engine: 221 A 210 kW (286 PS)

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

2,0 - 2,1 (1,95 - 2,15) mm (from BDC)

Rotational speed rev/min	Control rod travel mm	Fuel dolivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm
1100	21,40,1	17,0 - 17,3	0,5(0,9)			
225	7,5-7,7	1,7 - 2,3	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checking PRG che	g of slider ck (1)	Full-load a Setting po	•		cifications (4)	idle spec Setting p	•		cifications (5)	Torque o	control (3	2)
rev/min 1	Control rod travel mm	rev/min 3	Control rad travel rrsm 4	Control rpd travel rnm 5	rev/min 6	rev/min 7	Central red travel rnm 8	rev/min 9	Control rod travel mm		Control rod travel mm 12	
600	15,6-16,4	600	16,0	10,1	1145-1160		7,6		min.9,1 7,5-7,7	1100 550	11, 1-11, 3 11, 1-11, 3	
1350	0 - 1,0			4,0	1190-1220			365-4	05= 2,0			

Torque-control travel on flyweight assembly dimension a =

TIM

1145-1160 min. -1 Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F)		Control rod stop	Fuel delive	ery characteristics	Starting for little spee	d Gaste
rev/min	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	red trade cm <sup>3</sup> /1000 strokes:// mm 7
1100	170,0-173,0 (167,0-176,9)			•	100	19,0-21,0 mm R

Checking values in brackets

Testoil-ISO 4113

3

# Test Specifications Fuel Injection Pumps ② and Governors

40

MPP 001/4 UNI 13,8 a 2. Edition

n

PE 6 P 120 A 720 RS 167y RQ 225/1100 PA 118 R Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

supersedes 3.82 company: UNIC/IVECO

engine: 8210.02.051

Komb.-Nr. 0 401 846 366

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke 2,0 = 2,1 mm (from BDC)

Rotational speed rev/min	Control rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Cifference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	10,5+0,	16,6-169	0,5(0,9)			
225	7,5-7,	1,7 - 2,3	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

PRG che	de (1)	Full-load s Setting po			cifications (4)	idle spec Setting p	ooint		cufications (5)	Torque d	control Control rod
	Control rod travel mm		Cartrol red Street rnm 4	Cantrol red Stanti rrym 5	rev/min 6	rev/min 7	red travel mm 8	r <b>ev/min</b> 9	travel	rev/min 11	travel
550	15,6-16,4	550	16,0	9,5 4,0 1300			6,0		min. 7,5 5,9-6,1 BO=2,0 mm	550	10,5-10,6 10,5-10,7

Torque-control travel on flyweight assembly dimension a =

mm

1145-1160 mm

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	elivery on control lever np. 40°C (104°F)	Control rad stop	Fuel delivery characteristics 36			1 Custro		
rev/min	cm³/-1000 strakes	rev/min 3	rev/min 4	cm <sup>2</sup> /~1000 strokes 5		rev/min 6	nd trad cm <sup>3</sup> /1000 strokes / mm 7	
1100	1 66 0 - 169,0 (163,0 - 172,0)		-	•		100	19,0-21,0 mm RW	

Checking values in brackets

# **Test Specifications** Fuel Injection Pumps 2 PP 001/4 JEM 16,5 a and Governors

RO 750 PA 426 R PE 8 P 130 A 920/4 RS 301 1-6-2-4-8-3-7-5 je  $45^{\circ} \div 0,5^{\circ} (\div 0,75^{\circ})$ 

companyJenbacher Werke engine: C 160 S

Komb.-Nr. 0 401 848 076

Testoil-ISO 4113

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

(2.45 - 2.65)

		(2,40-2,00)				
Rotational speed rev/min 1	travel	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	12,0+0,	1 24,4-24,8	0,5(0,8)			,
300	6,1-6,3	2,1-3,0	0,8(0,7)			
•						

Adjust the fuel delivery from each outlet according to the values in [

#### **B. Governor Settings**

Taylor   T	Checking PRG che	ck	①	Full-load to Setting po		Test spec	erfications (4)	idle spec Setting p	point		cifications 5	Torque d	control Control rod
							rev/min 6	rev/min	mm		travel mm	rev/min	travel mm
	•	-		-	•	1	775-785	-	-	•	-	••	-

Torque-control travel
on flyweight assembly dimension a =

Sceed regulation: At

rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control fever Test oil temp. 40°C (104°F)		Control rod stop 3a	Fuel delive	ery characteris* 35		( Castre		
nev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/mm	cm³/~1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes:/ mm 7		
700	244,0-248,0 (241,0-251,0)	•	-	-	100	19,5-21,0 mm RW		

Checking values in brackets

WPP 001/4 FIA 13,8a 8.Edition

**Festoil-ISO 4113** 

PE 6 P120/720 RS 167

RQ 225/1100 PA 118 R

supersede2.81 company.Fiat 8210.02

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testes

#### A. Fuel Injection Pump Settings

Port closing at prestroke

2,00-2,10 (1,95-2,15)

Rotational speed rev/min	Control rod travel mm	Fuel delivery  cm³/100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	11,1+0,1	19,3 - 19,7	0,5(0,8)			
225	7,5-7,7	1,7 - 2,3	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checkin PRG che	Control rod	Full-load : Setting po	oint Control	Test spe Control	cifications (4)	Idle spe Setting (	-		criications 5	Torque	control
rev/min 1	travel mm 2		nd tood mm 4	mil travel mm 5	rev/min 6	r <del>ev</del> /min 7	nel trael inm 8	r <del>ev/min</del> 9	travel	rev/min 11	travel
600	15,6-16,4	600	16,0	10,1 4,0	1145-1160 1190-1220		7,6	100 225	7,5-7,7	1100 600	11,1-11,2 11,1-11,3
				-				365-	105= 2,0		
1350	0 - 1										

Torque-control travel
on flyweight assembly dimension a =

Speed regulation: At

1 mm less control

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d governor o Test oil ter	elivery on control lever np. 40°C (104°F)	Control rod stop	Fuel delivery characteristics			Starting f	uel delivery 6
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev:min 3	rev/min 4	cm³/-1000 strokes 5		r <del>av/mun</del> 6	Centre red travel cm <sup>3</sup> /1000 strokes:/ mm
1100	193,0-197,0 (190,0-200,0)		·			100	19,5-21,0 mmRW
	Nuar in Preschate						

Testoil-ISO 4113

# Test Specifications Fuel Injection Pumps ② and Governors

40

WPP 001/4 MB 11,4 h 1

.

PES 6 P 110 A 820 LS 422 Komb.-Nr. O 402 046 243 RQ 300/950 PA 483-1

supersedes

1. Edition

company: Daimler-Benz

engine: OM 407

137 kW (186 PS)

All test specifications are valid for Boach Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump, Settings

Port closing at prestroke

(2.95-3.15)

mm (from 8DC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
950	11,0+0,	10,1 - 10,3	0,4 (0,8)			
300	7,8-8,0	1,1 -1,7	0,4 (0,7)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Checkin PRG che	g of slider	Full-load s Setting po	•	-	cifications (4)	idle spec	•		cifications (5)	Torque o	control	(3)
rev/min	Control rod travel mm		Central red travel rnm 4	Central rad travel rnm	rev/min	rev/min 7	Control red travel rn/m	rev/min 9	Control rod travel mm		Control root travel mm 12	, 0
600	13,0-13,8	600	13,4	10,0 4,0 1150	995-1010 1015-1045 0 - 1,5	300	7,9	100 300 375-4	min.9,5 7,8-8,0 15 = 2,0	-	•	

Torque-control travel on flyweight assembly dimension a =

mm

Speed regulation: At

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	letivery on control lever mp. 40°C (104°F)	Control rod stop	Fuel deliv	ery characteristics 3b	Starting fi idle spec	Cantra
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes;/ mm 7
950	101,0-103,0 (98,0-106,0)	-	600	92,0-96,0 (89,0-99,0)	100	130,0-150,0

Checking values in brackets

9.82

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### **Test Specifications** Fuel Injection Pumps (A) and Governors

WPP 001/4 PEN 10,0 d 2 1. Edition

En

PE 6 P 110 A 320 RS 138 Z

RSV 200-1000 P 1/305 R

supersedes =

Volvo-Penta

Komb.-Nr. 0 401 876 262

D 100 B/PP

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

Testoil-ISO 4113

2,6 - 2,7(2.55-2.75)

mm (from BDG) RW 9,0 - 12,0 mm

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	8,4-8,5	8,8-9,0	0,4 (0,8)			
225	5,3-5,5	1,0-1,4	0,3 (0,6)		4.	

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

	r rated speed Control rod travel mm		Intermed	nate rated	speed	Control- lever deffection in degrees 7	_	rated speed  Control rod  travel  mm  9	11 3 /	rque control Control rod travel mm
loose ca.54	800 X = 7,4 4,0 1230	0,3-1,0 1040-1050 1070-1100 0,3-1,7		-	-	ca. 23	225 100 225 310-370	4,9 min.20,0 5,3-5,5 = 2,0	-	-

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

<b>C</b>	iiii Hoad stop emp. 40°C (104°F)	Rotational- speed limitat		el delivery Aracteristics	Starting f	uel delivery 5	49 iq	stop
rest oil to	cm <sup>3</sup> /1000 strokes	changed to) rev/min 3	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes 7	rev/min	travel mm 9
700	88,0-90,0 (85,0-93,0)	1040-1050*	-	•	100	310,0-340, = 20,0-21, mm RW	0 - 0	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

3.83

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# Test Specifications Fuel Injection Pumps (A) and Governors

40

WPP 001/4 EIC 3,9 g
1. Edition

En

PES 6 A 80 D 320 RS 2652

RSV 300-1050 A 0 B 2001-1 R

supersedes: -

company Eicher

Komb.-Nr. 0 400 876 314

engine EDL6-1

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

Testoil-ISO 4113

2,15-2,25 (2,10-2,30)

mm (from BDC)

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm 2	cm³/100 strokes 3	cm <sup>3</sup> / 100 strokes 4	mm 2	cm³/100 strokes	mm 6
1050	10,4+0,1	6,5-6,6	0,2(0,35)			
300	6,9-7,1	1,1-1,7	0,2(0,3)			
600	-	C, Sp. 4 u. 5	0,3			

Adjust the fuel delivery from each outlet according to the values in E

#### **B. Governor Settings**

Degree of deflection	r rated speed Control rod travel mm		Intermed	diate rated	sp <del>ee</del> d	Control- lever deflection in degrees 7		rated speed Control rod travel mm	11 3 1	rque control Control rod travel mm
loose	800 X =	0,3-1,0 5,0	-	•	•	ca. 25	300 100 300	6,5 min.19,0 6,9-7,1	1050 500 820	11,4-11,5
ca.47	9,4 4,0 1310	1090-1100 1165-1195 0,3-1,7					515-575 650			

The numbers denote the sequence of the tests

#### C. Settings for Fuel Injection Pump with Fitted Governor

(2b) Fu	ill-load stop	6 Rotational- speed limitat		uel delivery haracteristics	Starting f	fuel delivery 5	(4a) Idi	e stop
Test oil to rev/min 1	cm-y1000 strokes	Note changed to ) rev/min 3	rev/min	cm <sup>3</sup> /1000 strokes 5	rev/min	cm³/1000 strokes 7	ı av/mın 8	Control rod travel mm
1050	64,5-65,5 (63,0-67,0)	1090-1100	600	68,5-70,5 (67,0-72,0)	100	100,0-110 = 16,2-16 mm RW		-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

3.83

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WPP 001/4 VWW 2,4 g2

1. Edition

VE 6/10 F 1500 L 115-2 0 460 406 017

company: VWW

engine: 50 Hz. Aggr.

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test instructions and Test Equipment

Pre-stroke setting

Testoif-ISO 4113

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings	٧	Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1200	2,4 - 2,8	mm		
1.2 Supply pump pressure	1200	4,3 - 4,9	bar (kgf/cm²)		
1.3 Full-load delivery without charge-air pressure	1200	30,5 -31,5	cm³/1000 strokes		2,5 (3,0)
Full-load delivery with charge-air pressure	-	-	cm <sup>3</sup> /1000 strokes		
1.4 Idle speed regulation	350	6,0 -10,0	cm <sup>3</sup> /1000 strokes		2,5 (3,0)
1.5 Start	100	min. 35,0	cm <sup>3</sup> /1000 strokes		
1.6 Full-load speed regulation	1530	15,0 -21,0	cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent start of delivery	-	-			

2. Test Spe	cifications	checking values in br	rackets ( )	ā_		
2.1 Timing device	n = rev/min	900	2-1,6)	1200 (1,9-3,3)	1450 3,5-4,3 (3	
2.2 Supply pump	n = rev/min	600			1450	
	bar (kgf/cm²)	2,7-3,3			5,0-5,6	
Overflow delivery	n = rev/min	600			1450	)
	cm <sup>3</sup> /10 s	55-138 (40-	153)	_	55-138 (40	)-153)
2.3 Fuel deliveries					3. Dimer	tor assembly
Speed control lever	Rot. speed rev/min	Fuel delivery cm³/1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	and adjustment mm
End stop	1600	max. 1,5			K	3,2-3,4
	1555	5,5-14,5	(5,0-15,0)		KF	6,3-6,6
	1530		(14,0-22,0)		MS	1,4-1,6
	1450	26,8-29,2	(25,7-30,3)	.	svs	2,7
	1200		(28,7-33,3)			-,,
	600	23,0-26,0	(21,5-27,5)			
switch-off					A	
elect.	400	0			8	
idle stop	430	max. 1,5			Observations	
	350		(4,0-12,0)			
End stop	350	min. 30				
	450	max. 30				
2.4 Salenaid	mex. cut-in voltag	wated vol	10 V Itage 12V.			

6

Testoil-ISO 4113

**Test Specifications** Distributor-type Fuel-injection Pumps

WPP 001/4 VWW 1,6 L 3

1. Edition

VE 4/9 F 2400 R 66-14

0 460 494 118

supersedescompany: VWW engine: 086

#### Overflow temperature 45° C

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

**Test Instructions and Test Equipment** 

Pre-stroke setting

see VDT-W-460/...

1. Settings	Rot. speed rev/min	Settings		Charge-air press. bar (kgf/cm²)	Difference in delivery cm <sup>3</sup>	
9.1 Timing device travel	1500	2,3-2,7	mm			
1.2 Supply pump pressure	1500	4,9-5,5	ber (kgf/cm²)			
1.3 Full-load delivery without charge-air pressure	1500	31,5-32,5	cm³/1000 strokes		3,0	
Full-load delivery with charge-sir pressure	-	-	cm <sup>3</sup> /1000 strokes			
1.4 Idle speed regulation	450	6,0-10,0	cm³/1000 strokes		3,0	
1.5 Start	100	min. 38,0	cm³/1000 strokes			
1.6 Full-load speed regulation	2600	11,0-17,0	cm <sup>3</sup> /1000 strokes			
1.7 Load-dependent start of delivery	-	-		1		

2. Test Spe	cifications	checking values in brackets (	)	
2.1 Timing device	n = rev/min mm	1000 0,7-1,5(0,4-1,8)	1500 (1,8-3,2)	2400 5,5-6,3(5,2-6,6)
2.2 Supply pump	n = rev/min ber (kgt/cm²)	600 2,8-3,4		2400 7,0-7,6
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	600 55-138(40-153)		2400 55-138(40-153)
			Т	3 Dimensions

	CM-/1US					
2.3 Fuel deliveries					3. Dimen	ISIONS for assembly and adjustment
Speed control lever	Rot speed rev/men	Fuel delivery cm3/1000 strokes		Charge-air press. bar (kgf/cm²)	Designation	mm
End stop	2800	max.2,5			K	3,2-3,4
	2600		(10,0-18,0)		KF	5,7-6,0
	2400	26,5-28,5	(25,2-29,8)			1
	1500		(29,7-24,3)		MS	1,3-1,5
	600	19,5-22,5	(18,0-24,0)		svs	
elektr.	400	0			A	
mech.	2400	0				
idle stop	1200 600 450	max. 6,0 max. 7,0	(4,0-12,0)		Observations	
End stop	400 500	min. 15,5 max. 21,5				
2.4 Salanoid	mex. cut in vol		10 V tage 12V.			

**②** 

# Test Specifications Fuel Injection Pumps 2 and Governors

40

WPP 001/4 DAF 8,3 o 1 1. Edition

ĒΩ

PE 6 P 100 A 720 RS 447

RQ 225/1200 PA 617

Komb.-Nr. 0 401 846 471

supersedes

company: DAF

ingine: DHT 825

Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at v. stroke 3,2 - 3,3 mm (from BDC

Rotational speed rev/min	Control rod travel mm	Fuel delivery  cm³/100 strokes 3	Oifference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm	Fuel delivery  cm³/100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000 225	11,4+0, 5,3-5,		0,3(0,6) 0,3(0,5)			

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Checkin PRG che		Full-load sp Setting poir	nt		cifications (4)	idle spec Setting p	-		cifications 5	Torque o	(3)
r <del>ov</del> /min 1	travel		ed travel nm	red travel	rev/min 6	rev/min 7	fact bet	rev/min	travel	rev/min 11	travel mm
650	15,6-16,4	650	16,0	10,4 4,0 1450			5,4	225	min. 6,0 5,3- 5,5 05 = 2,0	1000 1200	11,4-11,5 11,3-11,5

Torque-control travel
on flyweight assembly dimension a =

0 ....

Speed regulation: A 235-1250 min-1

1 mm less control rod travel

#### C. Settings for Fuel Injection Pump with Fitted Governor

	elivery on ontrol lever 10.40°C (104°F)	Control rod stop	Fuel deliv	ery characteristics	33)	Starting fi Idle spee	d Cantre
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm³/-1000 strokes 5		rev/min 6	ret travel cm <sup>3</sup> /1000 strokes-/ mm 7
LDA 1000	0,7 bar 118,0-120,0 (116,0-122,0)	-	LDA 600	0 bar 94,0-97,0 (92,0-99,0)		100	195,0-215,0 = RW 19,5 - 21,0 mm

Checking values in brackets

### D. Adjustment Test for Manifold Pressure Compensator

Test at n =

600

rev/min decreasing pressure ~ in bar gauge pressure

DAF 8,3 o 1

- 2 -

Pump/governor	Setting	Measurement	diminution Control rod travel-
	Gauge pressure = bar	Gauge pressure = bar	difference
PE 6 PRS 447 + RQPA 617	0,32	0,70 0 0,27	11,2 - 11,3 11,4 - 11,5 10,4 - 10,5 10,6 - 10,8

Notes

(1) when n =

revimin and gauge pressure =

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 KHD 19,0 g 2. Edition

**Testoil-1SO 4113** 

PE 12 A 95 D 610LS 2449 ROV 300-1250 AB 1105 L supersedia 82 company:KHD

engine: BF 12 L 413 F 353 kW / 2500 min

1 - 4 - 9 - 8 - 5 - 2 - 11 - 10 - 3 - 6 - 7 - 12 0- 15- 60-75 -120-135-180-195-240-255-300-315° ±0,5° (±0,75°)

All test apecifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Komb.-Nr. 0 400 640 109

900 chasing at assets (1,75-1,95)

Port closing at pres	RITORE	1 80-1 90	mm (from BDC)	• •		
Rotational speed rev/min	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm³/ 100 strokes 4	Control rod travel mm 2	Fuel delivery cm³/100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1250	11,3	11,4 - 11,6	0,2(0,25			
300	5,9-6,1	0,9 - 1,5	0,7(0,9)			
		<u></u>		<u> </u>		

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated s	peed		Intermediate	rated sp	bed	Lower rated	speed		Sliding s	leeve travel
deflection	rev/min Control rod travel mm 2	Control rod travel mrn (2a)	deflection of control	rev/min 5	Control rod travel mm 4	Degree of deflection of control lever 7	rev/min	Control rod travel mm 3 9	rev/min	1) mm 11
max.	1250	15,2-17,8				ca. 12	100 300	min. 7,5 5,9-6,1	580	0,3-1,3
ca. 66	10,3 4,0 1500	1290-1300 1360-1390 0-1,0				325-410			920 1250	4,5-5,0 8,3
						<b>③</b>				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load of Control-roo Test oil ten		Rotational-speed 20 timetation intermediate speed	Fuel delivinghide s	ery characteristics (5a) peed (5b)	stracteristics (5e) Starting fuel delivery idle switching point		Torque- travel	control 5 Control rod
rev/min 1	cm <sup>3</sup> /1000 strokes .	rev/min 40 3	rev/min 4	cm <sup>3</sup> /1000 strokes	ev/mm	cm³/1000 strok <b>es</b> 7	revimm 8	mm 9+0,1
LDA 1250	0,7bar 113,5-115,5 (111,5-117,5)	1290-1300*	LDA 900 LDA 500	0,7 bar 118,0-121,0 (116,0-123,0 0 bar 69,0- 71,0 (67,0- 73,0)	100-2	1 <b>30,0-140,0</b> 20 (80-240)	1250 1100 900	11,3 11,6 11,6

Checking values in brackets

\* 1 mm less control rod travel than col. 2

#### D. Adjustment Test for Manifold Pressure Compensator

KHD 19,0 g -2-

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) _
2449 + 1105 L	0,7		11,6 - 11,7
		0,45	11,5 - 11,6
		0,20	10,0 - 10,2
		0	9,4 - 9,5

Notes

(1) when n =

rev/min and gauge pressure =

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 FIA 13,8 a 3
4. Edition

Testoil-ISO 4113

PE 6 P 120 A 720 RS 167 Z

ROV 225-1100 PA 177 R

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

supersede@..82

company:Fiat
8210.02
154,5 kW (210 PS)

Komb.-Nr. 0 401 846 378

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

### A. Fuel Injection Pump Settings

Port closing at pres		2.00-2.10	mm (from BDC)			
Rotational speed			Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min 1	mm 2	cm <sup>3</sup> /100 strokes 3	cm <sup>3</sup> / 100 strokes 4	mm 2	cm <sup>3</sup> /100 strokes 3	mm 6
1100	10,3+0,1	16,3 - 16,6	0,5(0,9)			
225	7 <b>,5</b> -7 <b>,7</b>	1,7 - 2,3	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated s	peed			Intermediate	rated spi	eed	Lower rated	speed	•	Sliding s	leeve travel
deflection	rev/min Control rod travel	Control rod travel	(D)	Degree of deflection of control		Control rod travel	Degree of deflection of control		Control rod travel		0
lever	mm	rev/min	<b>(2a)</b>		rev/min	mm (4)	lever	rev/min	mm (3)	rev/min 10	mm 11
1	2	3		4	5	в	ļ'	8	3	10	
max.	1100	15,2-17	,8	-	-	-	ca.13	100	min.9,0	225	0,9-1,0
			_					225	7,5-7,7	400 100	2,4-2,6 8,4
ca. 62		1140-11 1190-12 0 - 1	20				285 <b>-</b> 400				

Torque control travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ter		limitation intermediate speed	Fuel delivery characteristics (5 high idle speed (50)		Starting Idle switchir		Torque- travel	Control 5 Control rod
rev/men	cm³/1000 strokes	rev/min · 44	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm³/1000 strokes	rev/min	III III
1	2	3	4	5	6	7	8	9
1100	163,0-1660 (160,0-169,0)	1140-1150*			100	19,5-21,0 mm RW		

Checking values in brackets

\* 1 mm less control rod travel than col. 2

#### 0 **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 MB 21.9 b

2. Edition

PE12P120A320LS3819-1

ROV 350-1150PA493

PA 493-2

1-5-9-8-3-4-11-10-2-6-7-12

0-15-60-75-120-135-180-195-240-255-300-315° ±0,5°(±0,75°)

supersedes 0.82 company: Daimler-Benz

OM 424 A

390 kW (530 PS)

Komb.-Nr. 0 401 840 710

# Testoil-ISO 4113

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

### A. Fuel injection Pump Settings

(3,95-4,15) Port closing at prestroke

Rotational speed rev/min	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1150	11,1+0,	1 15,9-16,1	0,5(0,8)			
350	4,8-5,	0 1,4 - 2,0	0,8(0,7)			

Adjust the fuel delivery from each outlet according to the values in [

#### **B. Governor Settings**

Upper rated s	peed		Intermediate	rated sp	eed	Lower rated	speed		Sliding s	ieeve travel
deflection	Control	Control rod travel	Degree of deflection		Control rod travel	Degree of deflection		Control rod travel		0
	rod travel	rev/min 2s	of control	rev/min	mm 4	of control lever	rev/min	mm 3	rev/min	Mm 11
<u> </u>	4	3	ļ*	3	-	<u> </u>		,	10	
max.	115	15,2-17,8	-	-	-	ca.14	100	min.8,5	300	0,9-1,1
ca. 64	10, 4,0						350	6,9-7,1	580 870 1150	3,5-3,7 5,2-5,4 7,8
	1375	0-1,0				400-60 30	0			

Torque control travel a

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc Test oil ten			speed 2b Fuel delivery characteristics 5a Starting fuel delivery Idle speed 50 speed switching point		Torque- travel	Control rod		
rev/min	cm³/1000 strokes .	rev/min 4a	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	travel mm
1	2	3	4	5	6	7	8	9
LDA 1150	0,6 bar 159,0-161,0 (156,0-164,0)	1190-1200*	LDA 650 LDA 500	0,6 bar 164,0-170,0 (161,0-173,0 0 bar 127,0-129,0 (124,0-132,0		130,0-150,0	-	•

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

\* 1 mm less control rod travel than col. 2

### D. Adjustment Test for Manifold Pressure Compensator

Test at n =

rev/min decreasing pressure - in bar gauge pressure

500	_		
Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PE12PLS3819-1 +PA 493	0,38	0,60 0 0,32	10,8-10,9 11,1-11,2 9,8-9,9 10,1-10,3

Notes:

(1) when n =

rev/min and gauge pressure =



# Test Specifications Fuel Injection Pumps and Governors

40

WPP 001/4 MB 5,7 t 2. Edition

0 4113

PES 6 A 90 D 410 RS2293 Komb.-Nr. O 400 846 394 RQV 300-1425 AB982DL

אנטה נגדוייטטל ווא

supersed 5.77
compan Daimler-Benz
engine OM 352 A
126,5 kW (172 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke

2,15-2,25 12 10-2,30)

mm (from BDC)

		, 10-2,30/			<del>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</del>	
Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (torque-control valve)
rev/min	mm	cm <sup>3</sup> /100 strakes	100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
1400	11,1+0,1	7,7 - 7,8	0,3(0,45)			
1						
300	7,8-8,0	0,9 - 1,5	0,2(0,4)			
	:					
	1	İ	-	1	İ	

Adjust the fuel delivery from each outlet according to the values in

#### **B.** Governor Settings

Upper rated	speed		intermediate	rated sp	eed	Lower rated	speed		Sliding st	eeve travel
Degree of deflection of control tever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel		ontrol travel
1	2	3	4	5	6	7	8	9	10	11
max.	1425	16,0-19,3	-	-	-	ca.10	100 300	min.7,5 5,9-6,1	300	0,6-1,4
ca.61	4,0	1440-1450 1555-1585					570 <b>-</b> 800		1000 1450	5,0-5,4 8,3
	1675	0 - 1,0					370 <i>-</i>	440	-	-

Torque control travel a =

mm

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load ( Control-ro Test oil te		Rotational-speed Fuel delivery limitation		rery characteristics	ery characteristics Starting ( Idle switchin		intermediate rotational speed Torque-control travel	
rev/min	cm³/1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	mm
1	7	з	4	5	6	7	8	+0,1
LDA 140'	0,3 bar 77,0 - 78,0 (75,0 - 80,0)	1440-1450 *	LDA 500	0, 18 bar 70,0 - 73,0 (68,0 - 75,0)	100	13,7-14,3 mm RW 9,0-15,0	1400 1200	
1200	79,0 - 82,0 (77,0 - 84,0)		LDA 1400	0 bar 62,0 - 64,0 (60,0 - 66,0)	100-	220 240)		

Checking values in brackets

1 mm less control rod travel than col-2

BOSCH

Geschaftsbereich KH. Kundendianst. Kfz-Ausrustung.

1980 by Robert Bosch GmbH, Postfach 50, D-7000 Stutigart 1. Printed in the Federal Republic of Germany. Imprime en République Fédérale d'Allemagne par Robert Bosch GmbH.

### D. Adjustment Test for Manifold Pressure Compensator

MB 5,7 t - 2 -

Testatn =

500

decreasing pressure - in bar gauge pressure increasing

Pump/governor	Setting	Measurement	diminution Control rod travel- difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1) .
PES 6 ARS 2293 + RQVAB 982 DL	0,21	0,70 0 0,16	11,0-11,1 11,9-12,0 9,3-9,4 9,6-10,0

Notes

(1) when n =

rev/min and gauge pressure =

# Test Specifications Fuel Injection Pumps (1) and Governors

WPP 001/4 KHD 12,7 n 2. Edition

En

PE 8 A 95 D 410 LS 2609 RQV 300-1250 AB 1128 L Komb.-Nr. O 400 648 129 1 - 8 - 7 - 2 - 6 - 5 - 4 - 3 je 45 ° -0,5 ° (-0,75 °)

compank(HD engine: BF 8 L 413 F 235 kW (320 PS) 2500 min -

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at pres	troke	1-75-1-05	mm (from BDC)			
Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Central rod travel mm	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1250	11,6+0,1	11,6-11,7	0,3(0,6)			
300	5,9-6,1	1,6-2,2	0,3(0,5)			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Testoil-ISO 4113

Upper rated s	peed	1	Intermediate	rated sp	eed	Lower rated	speed		Sliding sleeve travel	
deflection	rev/min Control rod travel mm 2	Control rod travel mm rev/min 2a	deflection of control	r <b>e</b> v/min 5	Control rod travel mm 4	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 3	rev/min	mm 11
max.	1250	15,2-17,8	-	-	•	ca.11	100 300	min. 7,5 5,9-6,1	_	0,5-0,8 2,9-3,1
ca. 57		1290-1300 1370-1400 0 - 1,0				380-55		1 5,5-0,1		4,7-4,9 7,7
						<b>3</b>				

Torque conitol travel a =

mm

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load d Control-ro Test oil ter		Rotational-speed 2b irritation irriamediate speed	Fuel deli- high idle :	rery characteristics 5a peed 5b	Starting fuel delivery 6 Idle switching point		Torque- travel	Control rod
rev/min 1	cfh³/1000 strokee 2	rev/min 4a	rev/min 4	cm <sup>3</sup> /1000 strokes	rev/min 6	cm <sup>3</sup> /1000 strokes	rev/min	travel mm
LDA 1250	0,7 bar 116,0-117,0 (114,0-119,0	1290-1300 *	LDA 750	0,7 bar 121,0-124,0 (119,0-126,0		130,0-140,0 15,2- 15,6 mm RW	1250 750	11,6+0, 12,4+0, 12,1+0,
	;		LDA 500	0 bar 101,5-103,5 (99,5-105,5)				

Chacking values in brackets

\* 1 mm less control rod travel then col. 2

### D. Adjustment Test for Manifold Pressure Compensator

Test at n =

500

rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting  Gauge pressure = bar	Measurement  Gauge pressure = bar	diminution Control rod travel- difference mm (1)
PE 8 A LS2609 + AB 1128	0,27	0,7	12,1-12,2 12,4-12,5 11,7-11,8

Notes:

(1) when n =

rev/min and gauge pressure =

# **Test Specifications** Fuel Injection Pumps 1 and Governors

WPP 001/4 MB 21,9 € 2. Edition

PE 12 P 120 A 320 LS 3821

ROV 350-1150 PA 493-1

1 - 5 - 9 - 8 - 3 - 4 - 11 - 10 - 2 - 6 - 7 - 12 0 - 15 - 60 - 75 - 120 - 135 - 180 - 195 - 240 - 255 - 300 - 315° - 0,5°

Values only apply to test nozzle-and-holder assmf<sup>+</sup> 0.75°) bly 1 688 901 019 and fuel-injection test tubing 1 680 750 067

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

supersedet 0.82 companyDaimler-Benz engine: OM 424 LA 441 kW (600 PS) Schneefräse

Komb.-Nr.0401 840 712

#### A. Fuel Injection Pump Settings

4,0 - 4,1 (3,95-4,15) mm (from BDC) Zyl. 12 Port closing at prestroke

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1150	11,6+0,1	17,5-17,7	0,5(0,8)			
350	5,0-5,2	1,4-2,2	0,8(0,7)			
650	11,6+0,	1		]		
500	10,4+0,	C,Sp.4u.5	0,75			
1				<u> </u>	<u> </u>	

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

			Intermediate	rated spe	eed Control rod	Lower rated speed  Degree of Control rod			Sliding sleeve travel	
	rev/min Control rod travel mm	Control rod travel mm rev/min 2s	deflection of control lever	rev/min 5	travel	deflection of control lever 7	rev/min 8	travel mm 3	rev/min 10	mm 11
.max.	1150	15,2-17,8	-	- /	-	ca. 8	100 350	min.6,7 5,0-5,2	300 580	0,9-1,1 3,4-3,8
ca.58	10,6 4,0 1350	1190-1200 1240-1270 0 - 1,0				400-600		, 0,0 -0,2		5,1-5,4 7,8
						<b>3</b>				

Torque control travel a =

#### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load de Control-roc Test oil terr		Rotational-speed 20 limitation intermediate speed	Fuel deliv high idle s		Starting Idle switching	. 0	Torque- travel	Control cod
rev/min cfh³/1000 strokes		revimin 46	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	_	rev/min 8	mm 9
LDA 1150	0,6 bar 175,0-177,0 (172,0-180,0)	1190-1200*	LDA 650 LDA 500	0,6 bar 171,0-179,0 (168,0-182,0) 0 bar 143,0-145,0 (140,0-148,0)		140,0-160,0	•	•

Checking values in brackets

\* 1 mm less control rod travel than col. 2

3.83

BOSCH

#### D. Adjustment Test for Manifold Pressure Compensator

Test at n =

500

rev/min decreasing pressure – in bar gauge pressure

500						
Pump/governor	Setting	Measurement	diminution Control rod travel- difference			
	Gauge pressure = bar	Gauge pressure = bar	mm (1)			
PE12PLS3821	0,39		11,3 - 11,4			
+PA493-1		0,60	11,6 - 11,7			
		0	10,4 - 10,5			
		0,30	10,6 - 10,8			

Notes.

(1) when n =

rev/min and gauge pressure =

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4 MAC 11,0  $\times$  6

1. Edition

<u>Eo</u>

US-PES6P110A720RS6006

US-RQV300/600-1050PA621-7K

supersedes = companyMack

EME 6 - 250 engine: 250 PS

Komb.-Nr. 9 400 231 171

Testoil-ISO 4113

PLE-Maß = 0,740" - 0,820"

See Service Information VDT-I-MAC 002!

All test specifications are valid for Bosch-Fuel Injection Pump Test Benches and Testers

#### A. Fuel Injection Pump Settings

Port closing at prestroke (3, 2-3, 35) mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery  cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1050	11,7+0,1	17,7 - 17,9	0,4			
300	5,2-5,4	2,4 - 3,0	0,4			

Adjust the fuel delivery from each outlet according to the values in

#### **B. Governor Settings**

Upper rated speed			Intermediate rated speed				Lower rated	speed	Stiding sleeve travel			
Degree of deflection of control lever	rev/min Control rod travel mm	travel (	<b>9</b>	Degree of deflection of control lever	rev/min 5	Control of trave		Degree of deflection of control lever	rev/min 8	Control rod travel	rev/min	mme 11
max.	1120	15, 2-17,	8	-	-	-		ca. 20	250	9,8-11,3	-	-
ca. 61	10,7 4,0 1230	1090-110 1165-119 0 - 1,0	5	-				<b>3</b>	300 400 690-7	7,9-8,1 3,8-5,2 750 = 2,0		

Torque control travel a =

m/r

#### C. Settings for Fuel Injection Pump with Fitted Governor

Control-rod stop				Fuel delin high idle s	rery characteristics (5e) speed (50)	Starting Idle switchin	. •	Torque-control 5 travel  Control ro	
rev/min cm³/1000 strokes .		rev/min	•	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	revimin	travel mm
1	2	3		4	5	6	7	8	9
1050	176,5-178,5	1090-1100	*	850 630 800	184,0-188,0 202,0-206,0 PLE 121,0-129,0	100	120,0-180,0	850 750 630	11,7 11,6+0,1 11,9+0,1 12,2+0,1 12,8+0,1 12,1+0,1

Checking values in brackets

\* 1 mm less control rad travel than coi. 2